STATE OF NEW HAMPSHIRE
INTER-DEPARTMENT COMMUNICATION

DATE: June 26, 2018

FROM: Matt Urban
Wetlands Program Manager

AT (OFFICE): Department of Transportation
Bureau of Environment

SUBJECT **(Response to RFMI)**
Dummer, 16304A
DES#2018-00986

TO Collis Adams, Administrator
New Hampshire Wetlands Bureau
29 Hazen Drive, P.O. Box 95
Concord, NH 03302-0095

Forwarded herewith is the Department of Transportation's (DOT) response to the Request for More Information (RFMI) dated June 14, 2018.

The DOT would like to thank the Department of Environmental Services (DES) for the thoughtful review of our Request for Mitigation Reconsideration. At this time, based on the need to stay on track for project advertising, the DOT will accept the current mitigation package without further consideration for possible reductions in mitigation. The additional time it would take to develop and articulate the environmental benefits gained by moving the roadway away from the river may jeopardize the project timeline based on our agencies' differing opinions on the value moving the roadway provides. While we have no formal Functions and Values Assessment that would provide substantive justification as to the environmental benefit of relocating the roadway, we believe it to be a common sense environmental outcome.

The current mitigation proposal approach would mitigate for permanent wetland impacts (totaling 259,384 sq. ft.) and stream impacts (totaling 219 lin. ft.) by making a single, one-time, in-lieu fee payment to the Aquatic Resource Mitigation (ARM) Fund. As allowed, the DOT has applied the 12% credit for total suspended solids removal associated with water quality treatment, as well as a deduction for ditch line impacts that will be functionally replaced in kind. As such, the DOT requests concurrence in the anticipated mitigation payment of **$866,162.03,** which will be identified as an individual project obligation in the G&C request for construction approval.

The following RFMI responses will be addressed in the numerical order in which they were received.

1. The impact plans are posted on the DOT webpage pursuant to our RFMI LEAN process, which allows any viewer the ability to zoom in and out for readability. Nonetheless, please find the enclosed full size set of plans as requested. The existing and proposed contours can be found on the erosion control sheets.

2. In regards to the SRE Wetlands Report Pages M-79 to M90: Sheets M-79, M-80, and M-81 were provided specifically to show sheets with invasive species locations. As such, if there were no invasive species found on the other sheets they would not have been provided which may explain why the set may have seemed incomplete. As for sheets M-85 through M-90 being out of order: We see how the station numbers are not sequential from one sheet to the next because they are actually in reverse order. Unfortunately, this is how we received the pdf of the wetlands report which means we don't have the ability to manipulate the order of the pages and page numbers. If you wish to

review these sheets in order of station numbering view the sheets in the following order 6, 5, 4, 3, 2, 1. Or M90, M89, M88, M87, M86, M85. Please confirm that a complete set of plans is not necessary having provided this explanation.

3. A mitigation summary was included within the supplemental narrative section of the application. Please refer to Supplemental Narrative pages 17, 18, and 19 for the summary report. Mitigation coordination was documented in the minutes from the Natural Resource Agency Meetings. Please refer Appendix A to view the resource agency meeting minutes. We acknowledge that the Appendix B divider page indicated that the mitigation report and coordination would be in that section. However, since they were provided in other sections it appears they were left out of Appendix B to avoid duplication and the divider page was not edited. The divider page should have been edited to refer you to the other locations in the application where that information could be found.

4. In review of Table 3. Wetland and Stream Culverts it was determined that the table has two minor areas that would benefit from clarification. Other than that there was no inaccurate information. The table accurately references the station #'s, the size of the existing pipes, and the size of proposed replacement pipes. The first of two areas for improved clarification is in Row EX-3 where the location station indicated 1002+5X it should have read 1002+50. The second row of information that would benefit from clarification was EX-8. This row of information noted the existing 15" CMP at Station 1023+33. However, the proposed 18" RCP is shown on the plans to be relocated further to the north at Station 1024+50. No other errors were found in the table. Please find the attached table that has been edited to address these two revisions.

5. Please find the attached Specifications for humus and seed. The DOT's plan for re-vegetation of all disturbed soils consists of requiring the contractor to adhere to the specs that have been provided for all areas of soil disturbance.

6. While there is no specific question to address in RFMI #6, the DOT will attempt to provide some insight on what we think DES is looking for with the statement that has been made. From the early stages of this project during the NEPA evaluation, DOT has been assessing and reviewing several design alternatives that have considered various ways to minimize impacts. Some of those minimization alternatives included No build, on-line rehabilitation, on-line reconstruction, single lane offset reconstruction, and the selected alternative which was re-align 50' to west. While some of the other alternatives may have had lesser wetland impacts, they did not provide the same benefits that the selected alternative did. Once the selected alternative was chosen, the design teams have continuously worked to minimize the impacts to the wetlands to the greatest extent possible, as touched upon in our answers to #7 and #8 below. With our impacts minimized to the greatest extent practicable, DOT began to work out the proposed mitigation package. We feel we are more than adequately mitigating our impacts with a $866,162.03 ARM Fund payment.

7. While an attempt was made to reduce the number of culverts as much as possible, in order to minimize the extent of the impacts along the west side of the roadway, we looked to minimize drainage pattern changes (i.e., in order to further reduce the number culverts, the ditch lines and remaining culverts would have needed to get bigger, which translates to greater impacts). In addition, through coordination with the DOT's Water Quality Program Manager, the design team purposely avoided creating new culvert outlets (which would have been needed in some cases if we were to try to combine/eliminate culvert crossings), again, in an attempt to minimize impacts (i.e., creating new outlet channels extending to the river).

8. In several locations, catch basins were introduced at the culvert locations to minimize wetland impacts along the west side of the roadway. The catch basins allowed us to increase the pipe slopes matching into the proposed ditch lines at a more consistent offset, again minimizing the needed slope work to the extent practicable. In addition, catch basins facilitated our underdrain design. Due to the nature of the existing topography and wet soils along the west side of the roadway, underdrain is needed along the entire length of the project. This underdrain system needs to outlet either along the roadway slope (to a ditch line), or connect to a drainage structure to ensure it operates as designed. At several locations on this project, outletting the underdrain system was challenging (i.e., the west side ditch line was too high in elevation). The options would have been to try and cross the roadway and find outlet locations along the east side of the roadway. This would have resulted in large

gaps/sections of roadway where no underdrain coverage would be provided, which would not be a sound engineering practice given the characteristics of the project area, and the intent of the project.

Relative to the lengths of the culverts, the proposed culverts (under the new roadway) in most cases extend through the existing roadway limits along the east side of the proposed (off-line) roadway segment. The alternative would have been to limit the proposed culvert lengths to the proposed roadway section only, which would have created the need for outlet ditch/channel treatments through the "vegetated buffer" treatment area along the east side of the roadway. It was determined that reducing the amount of vegetated buffer area for this purpose would be detrimental to the proposed treatment package, and as such discounted.

9. In review of the wetland impact plans, Station 1032 to 1033 DOT was not able to locate the "errant lines" that are alluded to. We do see several intentional wetland classification leaders that point to the specific wetlands that are impacted so the Cowardin classification of the wetlands is clear.

10. In review of the wetland impact plans, Station 1050, DOT was not able to locate the "erroneous wetland delineation lines" that are alluded to. The wetlands shown on the plans were delineated by a Certified Wetland Scientist (CWS): Stoney Ridge Environmental. As such, we are not comfortable adjusting/deleting wetlands shown in this area.

11. Please find the attached detail for the proposed pull off locations as requested.

The lead people to contact for this project are Jennifer Reczek, Bureau of Highway Design (271-2171 or Jennifer.Reczek@dot.nh.gov) or Matt Urban, Wetlands Program Manager, Bureau of Environment (271-3226 or matt.urban@dot.nh.gov).

If and when this application meets with the approval of the Bureau, please send the permit directly to Matt Urban, Wetlands Program Manager, Bureau of Environment.

MRU:sel
Enclosures
cc:
BOE Original
Gino Infascelli, DES
Town of Dummer
Dummer Conservation Commission
Mark Kern, EPA (Via Email)
Michael Hick, ACOE (Via Email)
Carol Henderson, F&G (Via Email)
Gregg Comstock, NHDES (Via Email)
Pete Stamnas, DOT (Via Email)
Mark Hemmerlein, DOT (Via Email)
Jennifer Reczek, DOT (Via Email)
Dan Prehemo, DOT (Via Email)
Kevin Nyhan, DOT (Via Email)
S:\Environment\PROJECTS\DUMMER\16304A\Wetlands\Response to RFMI v.2.DOC

The State of New Hampshire

Department of Environmental Services

Robert R. Scott, Commissioner

June 14, 2018

PETER E. STAMNAS
DIRECTOR OF PROJECT DEVELOPMENT
NH DEPT OF TRANSPORTATION
PO BOX 483
CONCORD NH 03302

RE: Response to request for reconsideration of the wetland mitigation assessment and Request for More Information; NHDES File # 2018-00986
NH Rt. 16, Dummer, NH (16304A)

Dear Mr. Stamnas: Pete

The New Hampshire Department of Environmental Services Wetlands Bureau (NHDES) has received your letter dated May 11, 2018 requesting reconsideration of the wetland mitigation requirements for the Dummer project. We also have conducted a technical review of the application to give some perspective to your request.

NHDES is committed to working with the NH Dept. of Transportation (NHDOT) to develop a mitigation package that adequately mitigates for the loss of forested wetlands associated with the project.

On October 16, 2017 a field inspection was conducted with representatives from NHDES, NHDOT, NH Fish and Game Dept. (NHF&G) and The Nature Conservancy (TNC). It is important to note that the alternative design information, project plans, and stream assessment report were not available during the inspection.

During the inspection NHDOT indicated the 60 in. culvert at the brook crossing was sound and did not need replacement and this is confirmed on page 34 of the pending application. Rather, NHDOT proposes to extend the culvert to accommodate the proposed roadway shift. NHDES requested the outlet end of the culvert be removed a length equal to the culvert inlet extension. NHDES also asked about alternate designs that were considered for the brook crossing.

NHDES is not clear where there is any bank restoration as the application indicates just 164 sq. ft. of bank impacts. Please clarify NHDOT's evaluation and assessment relative to bank impacts and bank restoration work.

The jurisdictional areas proposed to be impacted are 86% forested wetlands. The application states the pavement removed will be converted to a grassed vegetated buffer (page 6 of the Supplemental narrative) consisting of humus and seeding (see appendix K). NHDES does not consider the construction of grassy areas as mitigation for the loss of forested wetlands as these grassy areas will not mitigate for the loss of wildlife habitat, wildlife shelter, roost sites and shade provided by forested wetlands. Please provide information as to which Function and Value Assessment Method was used to make this determination.

The 12% mitigation credit based on total suspended solids removal was information provided by the consultant and was found to be reasonable to NHDES and the Corps during preliminary review of the project. Your letter requests the vegetated buffer be looked at as a broader ecological benefit for upland preservation/bank restoration providing long-lasting benefits including wildlife habitat, wildlife shelter, roost sites, reduced runoff, shade, and mitigating effects of untreated stormwater directly discharging into the river.

NHDOT believes the 12% credit is too low for the benefits listed yet there is no other information presented to arrive at any other determination. NHDES is willing to work with NHDOT to develop a mitigation package that adequately mitigates for the wetland impacts. All of the rules found in chapter Env-Wt 800 must be addressed.

Your letter indicates that one element was not specifically discussed and has a bearing on the mitigation impact totals and cost estimates. Specifically, that ditch line impacts are currently included in the proposed mitigation payment but they should be self-mitigating since the ditch will be reconstructed in a different location. NHDES agrees and there is no mitigation payment required for that portion of the project. See page 17 of the Supplemental Narrative.

In order to keep this application moving forward, below is a Request for More Information (RFMI) so NHDES can complete the technical review. Please have your technical staff work directly with Gino Infascelli and Lori Sommer to address the items in the RFMI. NHDES staff is willing to work directly with your staff to discuss ways to improve the mitigation package so that the ARM fund payment might be reduced. Please let me know if you would like me to facilitate such a meeting.

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NHDES reviewed the above-referenced **Standard Dredge and Fill** application and has determined that additional information is needed to clarify and complete the application. This information is required in accordance with RSA 482-A (the New Hampshire Dredge and Fill Law), specifically RSA 482-A:3, XIV(a)(2), and Administrative Rules Env-Wt 100 through 900.

In order for NHDES to render a decision on your application, **all** of the information requested below must be addressed in full. In order to facilitate a timely decision, your response must be formatted to coincide with the information as requested below; *i.e.*, each numbered item below must be likewise numbered in your response. NHDES will make a **final determination** based upon the information provided in your response to this request.

1. Please provide full size plans by VHB printed to scale with existing and proposed contours which are labeled and readable.
2. Appendix M- SRE Wetlands Report Pages M-79 to M-90 are plans that include duplicate pages, duplicate half pages, are out of order and is missing Sheet 1 of 6. Provide a new, complete set of plans.
3. Appendix B states Mitigation Report/ Coordination/ ARM Calculator. Only the ARM calculator was included in Appendix B. Please provide the remaining information.
4. Table 3 Wetland and Stream Crossings. Many locations noting crossings by road stations are inaccurate. Please correct and replace the table.
5. Please provide plans for re-vegetation of all disturbed soil areas.

6. The minutes of the October 18, 2017 minutes state that NHDES requested efforts to minimize wetland impacts and the project engineers indicated they would address minimization in accordance with Env-Wt 302.03, Avoidance, Minimization and Mitigation.
7. Section 6.0 of the supplemental narrative indicates that 13 of 17 culverts will be replaced at approximately the same locations and the locations of the existing culvert outlets will be retained. As the roadway is moving approximately 50 feet uphill from the current roadway retaining the existing culvert outlets appears to be unnecessary. Please change the design to limit and minimize the length of culverts.
8. The application indicates that the chosen alternative includes portions of the existing roadway will be removed and converted to a grassed vegetated buffer for water quality treatment and that moving the roadway will allow room for water quality treatment areas to treat runoff before it discharges to the river. The design plans show the installation of catch basins connecting to cross culverts directly discharging to the river. The design should be modified to eliminate the use of catch basins in any cross culverts and, limit the length of culverts to only the area needed to protect the new road. The July 19, 2017 presentation stated the existing culverts are proposed to be removed. Any use of catch basins need to be designed to connect into roadside ditch/ treatment swales prior to discharge into jurisdictional areas.
9. Please remove all errant lines in the plan sets, for example STA 1032 to 1033.
10. Please remove all erroneous wetland delineations lines as discussed at the October 2017 inspection, for example at STA 1050.
11. Plans include a note, "Proposed Pull Off Location" (see detail) however, no detail was found in the plans. Please provide that detail.

Please include the file number (2018-00986) on your response to this request as well as on all other correspondence submitted relative to this application, and forward a copy of all information to the town Conservation Commission. The requested information should be submitted to my attention at NHDES as soon as practicable, but in any event no later than 60 days from the date of this request.

Please be aware that in accordance with RSA 482-A:3, XIV(a)(2), failure to provide a single and complete response to the items listed above within 60 days of the date of this request will result in a denial of your application

If you have any questions, please contact me directly at collis.adams@des.nh.gov or (603)271-4054 or Gino Infascelli at gino.infascelli@des.nh.gov or (603) 271-4194.

Sincerely,

Collis G. Adams, CWS, CPESC
Wetlands Bureau Administrator

cc: Dummer Municipal Clerk/Conservation Commission
ec: GREGG COMSTOCK, NHDES
MARK KERN, US EPA
CAROL HENDERSON, NH F & G
MICHAEL HICKS, US ACOE
Matt Urban, NHDOT

Full Sized Plans

(See Roll Plan)

Table #3 - Wetland and Stream Culverts

Revised Table

Table 3. Wetland and Stream Culverts

Catchment ID	Crossing Type	Location	Existing			Proposed		
			Size (in)	Type	Length (lin. ft.)	Size (in)	Type	Length (lin. ft.)
EX-2	Wetland	1001+56	15	RCP	47	No culvert change		
EX-3	Wetland	1002+50	18	SPP	70	No culvert change		
EX-4	Wetland	1004+04	15	CMP	47	No culvert change		
EX-5 (Robbins Brook)	*Perennial Stream*	*1010+24*	*60*	*CMP*	*80*	*60*	*CMP*	*94*
EX-6	Wetland	1013+23	15	CMP	52	18	RCP	59
EX-7	Wetland	1020+78	15	RCP	42	18	RCP	95
EX-8	Wetland	1023+33	15	CMP	50	18*	RCP	101
EX-9	Wetland	1127+00	15	CMP	48	18	RCP	96
EX-10	Wetland	1130+72	12	CMP	40	18	RCP	95
EX-11	Wetland	1132+51	18 (in), 24 (out)	RCP	45	18	RCP	95
EX-12	*Intermittent Stream*	*1140+00*	*18*	*RCP*	*45*	*30*	*RCP*	*99*
EX-12A	Wetland	Gravel access road	18	CMP		No culvert change		
EX-12B*	Wetland	Gravel access road	18	CMP	29	12	Pipe	45
EX-13	Wetland	1044+34	18	RCP	40	18	RCP	96
EX-14	Wetland	1148+16	15	RCP	40	18	RCP	96
EX-15	Wetland	1050+50	15	RCP	43	24	RCP	116
EX-16	Wetland	1052+60	18	RCP	45	24	RCP	91
EX-17	Wetland	1055+15	15	RCP	46	18	RCP	95
EX-18	Wetland	1069+29 (Dummer Pond Road)	18	SPP	41	18	RCP	52
*EX-19***	*Intermittent Stream*	*1069+50 (Dummer Pond Road)*	*36*	*SPP*	*41*	*No culvert change*		
*EX-20***	*Intermittent Stream*	*1069+69*	*36*	*CMP*	*63*	*No culvert change*		

*Culvert EX-12B to be removed and a new culvert installed along the gravel access road to the west.

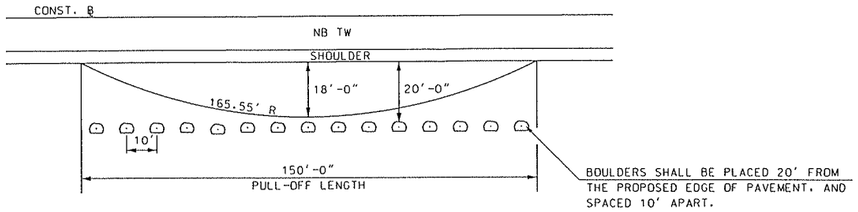
**Culvert EX-19 and EX-20 convey the same intermittent stream channel.

* 18" RCP Relocated to Station 1024+50

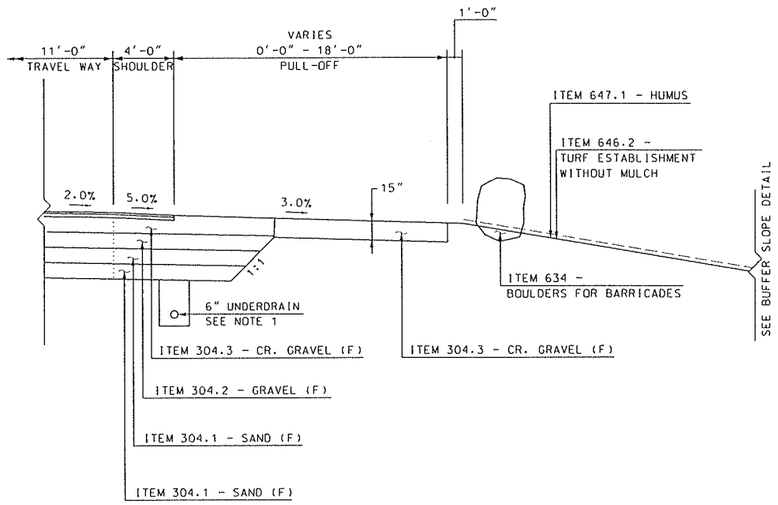
6.1 Wetland Culverts

As stated previously, approximately 13 of the 17 wetland culverts within the project corridor will be replaced with reinforced concrete pipes (RCP) and will either be upgraded or retained at their current size. The replacement culverts will be installed at approximately the same locations as the existing culverts and the locations of the

Proposed Pull-off Details



PLAN

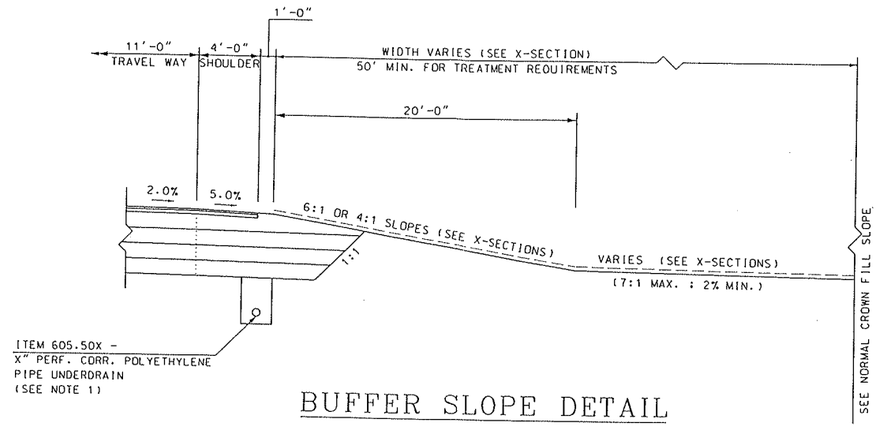


SECTION

PULL-OFF DETAILS

NOT TO SCALE

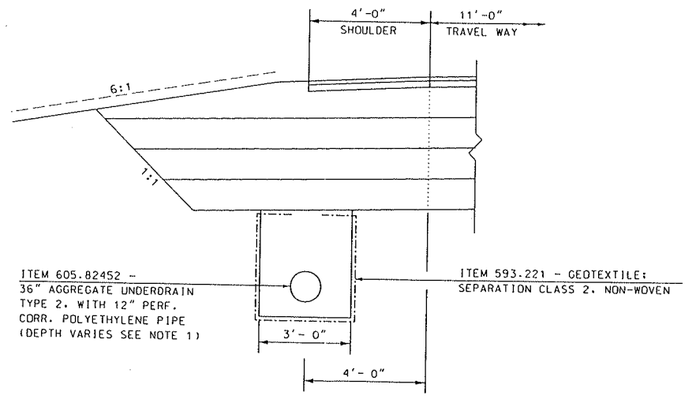
STA. 1021+25 - STA. 1022+75, RT
STA. 1027+75 - STA. 1029+25, RT
STA. 1036+75 - STA. 1038+25, RT
STA. 1048+75 - STA. 1050+25, RT



BUFFER SLOPE DETAIL

NOT TO SCALE

STA. 1019+50 - STA. 1067+50, RT



12" UNDERDRAIN DETAIL

NOT TO SCALE

NOTES:

1. SEE PLANS AND CROSS SECTIONS FOR UNDERDRAIN PLACEMENT AND DEPTHS. (STANDARDS DETAIL SHOWN ON STANDARD NO. HW-3, PLATE 3).
   STA. 1006+00.0 - 1069+61.2, LT
   STA. 1021+00.0 - 1052+50.0, RT
   STA. 1055+10.3 - 1064+00.0, RT

REVISIONS AFTER PROPOSAL

NUMBER	DESCRIPTION	STATION	STATION	DATE

SDR PROCESSED	VHB TEAM	DATE 7/2017
NEW DESIGN	S. HILL	DATE 11/2017
SHEET CHECKED	F. KOCZALKA	DATE 11/2017
AS BUILT DETAILS		DATE

vhb

DATE PLOTTED	VHB PROJECT NO.	MODEL
4/20/2018	52900.16	-

STATE OF NEW HAMPSHIRE

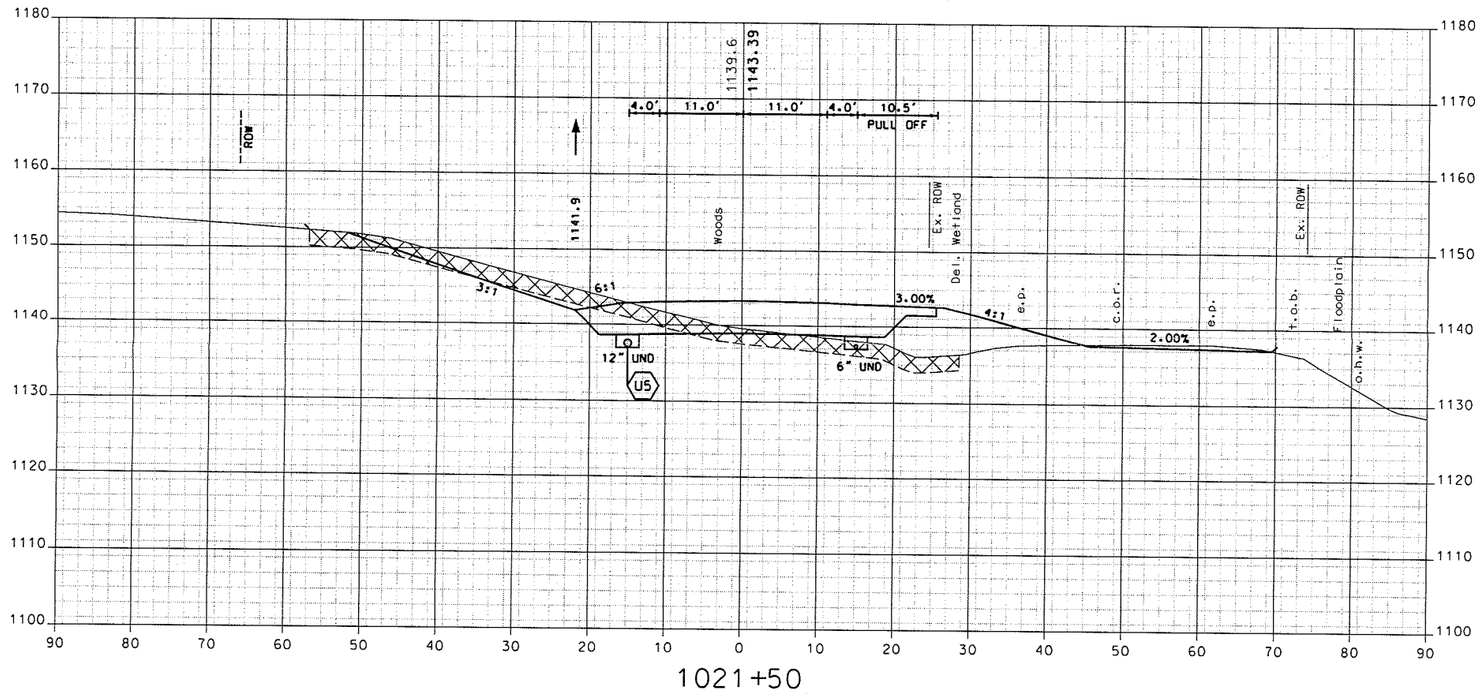
DEPARTMENT OF TRANSPORTATION ◦ BUREAU OF HIGHWAY DESIGN

MISCELLANEOUS DETAILS

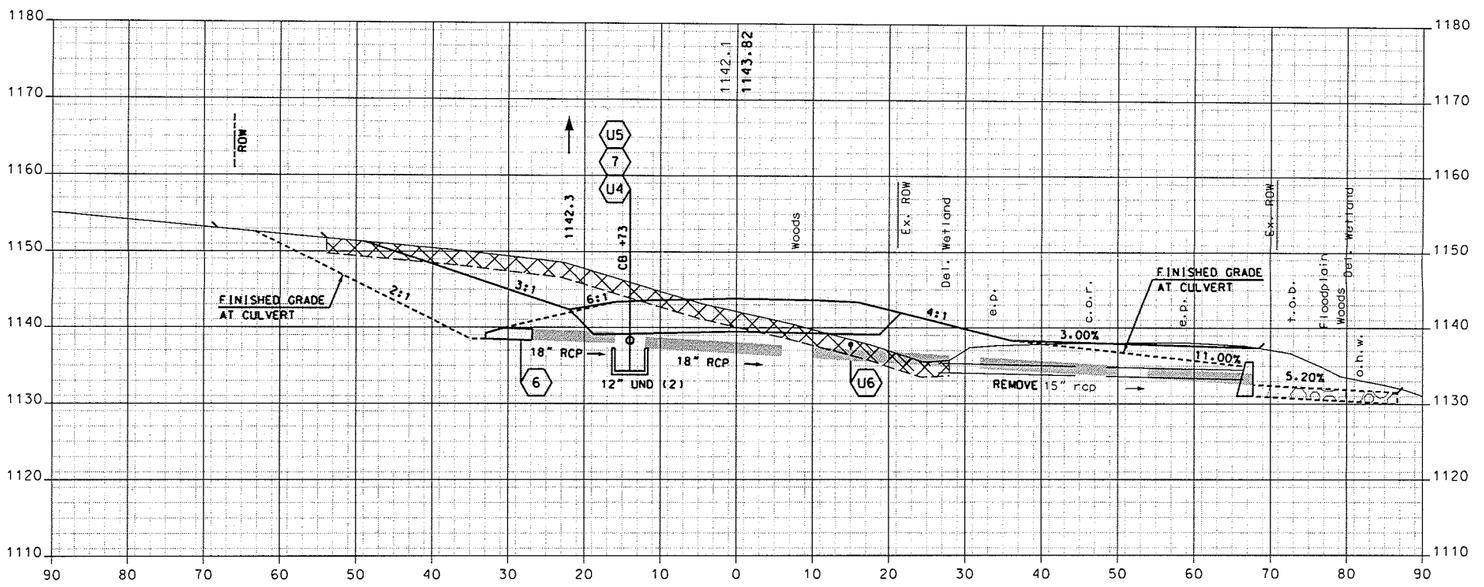
DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
16304DT01.dgn	16304	11	86

SDR PROCESSED	VHB TEAM	DATE	7/2017
NEW DESIGN	S. HILL	DATE	11/2017
SHEET CHECKED	F. KOCZALKA	DATE	11/2017
AS BUILT DETAILS		DATE	

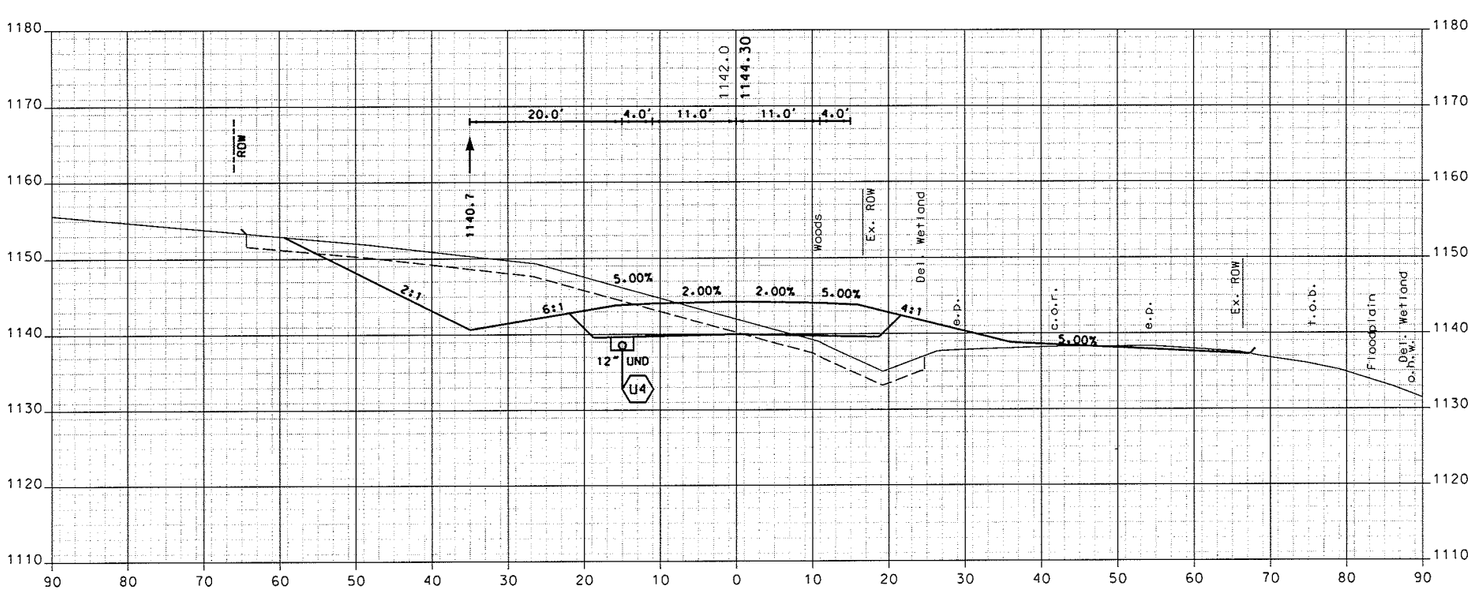
REVISIONS AFTER PROPOSAL				
NUMBER	DATE	STATION	STATION	DESCRIPTION



1021+50



1021+00



1020+50

LEGEND

ORGANIC DEPOSIT LIMITS

MUCK EXCAVATION LIMITS

10 0 10 20

SCALE IN FEET

vhb

NH RTE 16

SHEET TOTALS

COMMON EXCAV. 546.1 C.Y. ROCK EXCAV. - C.Y.

FILL 540.1 C.Y. MUCK EXCAV. 753.4 C.Y.

DATE PLOTTED	VHB PROJECT NO.	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
4/20/2018	52900.16	16304xs.dgn	16304	50	86

Plans for re-vegetation

(Erosion Control, Humus, Seed Spec's and Typical Section)

SECTION 645 -- EROSION CONTROL

Description

1.1 Erosion Control Products. This work shall consist of furnishing and placing hay mulch, bark mulch, " Rolled Erosion Control Products" (RECP), or other material, to provide soil stabilization and/or erosion control on slopes or in channels at locations shown on the plans or where ordered.

1.1.1 Temporary Slope Stabilization Type A shall be a temporary, photodegradable or biodegradable RECP specified for protection of slopes of 3:1 or flatter. This material may also be specified for temporary protection of channels expected to experience flow-induced shear of 1.5 lbs/ft² or less. These products shall maintain their functional integrity for a minimum of 12 months and then degrade.

1.1.2 Temporary Slope Stabilization Type B (Wildlife friendly) shall be a temporary, biodegradable RECP specified for protection of slopes of 3:1 or flatter in areas where wildlife ensnarement is a concern. This material may also be specified for temporary protection of channels expected to experience flow-induced shear of 1.5 lbs/ft² or less. These products shall maintain their functional integrity for a minimum of 12 months and then biodegrade.

1.1.3 Temporary Slope Stabilization Type C shall be a temporary, photodegradable or biodegradable RECP specified for protection of slopes of 1½:1 or flatter. This material may also be specified for temporary protection of channels expected to experience flow-induced shear of 2.0 lbs/ft² or less. These products shall maintain their functional integrity for a minimum of 12 months and then degrade.

1.1.4 Temporary Slope Stabilization Type D (Wildlife friendly) shall be shall be a temporary, biodegradable RECP specified for protection of slopes of 1½:1 or flatter in areas where wildlife ensnarement is a concern. This material may also be specified for temporary protection of channels expected to experience flow-induced shear of 2.0 lbs/ft² or less. These products shall maintain their functional integrity for a minimum of 12 months and then biodegrade.

1.1.5 Permanent Channel Stabilization Type A shall be a permanent " Turf Reinforcement Mat" (TRM) specified for permanent protection of channels or ditches that are expected to experience flow-induced shear of 3.0 lbs/ft² or less.

1.1.6 Permanent Channel Stabilization Type B shall be a permanent TRM specified for permanent protection of channels or ditches that are expected to experience flow-induced shear of 5.0 lbs/ft² or less.

1.2 Storm Water Pollution Prevention Plan (SWPPP). This work shall consist of a temporary erosion and sediment control and storm water management plan, hereinafter called the Storm Water Pollution Prevention Plan or " SWPPP". The work includes all necessary preparations for submissions and revisions of the SWPPP to obtain approval by the Department. This work shall also include monitoring the approved SWPPP during all phases of construction.

1.2.1 The Department will furnish the following data to the Contractor:

- Specific reproducible plan sheets and cross-sections of the project, as requested.
- Drainage calculations and plans (drainage area size and characteristics; runoff volume; type, size, and slope of pipes; invert elevations; and outlet velocities), as available.
- Geotechnical Report including soil boring logs, soil types, and test pit data, as available.
- Permits and certifications obtained for the project.
- A list of environmental commitments.
- A copy of the NHDOT's Notice of Intent application.
- A copy of the NHDOT's Acknowledgement letter from EPA.
- Documentation of permit eligibility related to federally listed threatened and endangered species.
- NHDES Wetlands Permit " Plan of Record".

1.2.2 Recommended guides for the preparation of the SWPPP are the National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP), **June 30th, 2008 (73 FR 40338).** The AASHTO Highway Drainage Guideline, Volume III, *Guidelines for Erosion and Sediment Control in Highway Construction*, available from the American Association of State Highway and Transportation Officials, Inc., 444 North Capitol St. N.W., Suite 249, Washington, D.C. 20001; the ***New Hampshire Stormwater Management Manual, Volume 3, Construction Phase Erosion and Sediment Controls*** available from the New Hampshire Department of

Environmental Services (NHDES) Public Information and Permitting Office, PO Box 95, 6 Hazen Drive, Concord, NH 03302-0095, Telephone (603) 271-2975 and the Rockingham County Conservation District in Exeter, NH, Telephone (603) 772-4385; the NHDOT Guidelines for Temporary Erosion and Sediment Control and Stormwater Management (May 2002).

1.2.3 The SWPPP shall be consistent with the provisions of 107.01.

Materials

2.1 Mulch

2.1.1 Hay mulch shall consist of cured hay, free from noxious weeds including prohibited invasive plants listed in Table 3800.1 of Part AGR 3800 and rough or woody materials.

2.1.2 Bark mulch shall be bark chippings graded to be approximately 3/8 to 2" in width. The chippings shall not have been stored so long and under such conditions that the material has decomposed sufficiently so that it has lost its fibrous texture. Bark mulch must be approved as to grading and condition prior to its use.

2.1.3 Temporary mulches shall be hay, straw, fiber mats, netting, wood cellulose, bark, chips, or other approved material. The mulch shall be reasonably clean and free of noxious weeds and materials toxic to plant growth.

2.2 Slope and channel stabilization products of the type specified shall be a Rolled Erosion Control Product (RECP) that is listed on the Qualified Products List.

2.3 Staples for soil stabilization material matting shall be those specified by the manufacturer.

2.4 Grass seed for erosion control shall be one of the following:

(a) Seed for temporary control shall be a quick growing species suitable to the area, such as annual or perennial ryegrass, providing a temporary cover which will not compete with the grasses subsequently sown for permanent cover.
(b) Seed for a more permanent control shall be of the type specified in the plans or as set forth in 644.2.3.

2.5 Hay bales for erosion control shall consist of rectangular shaped bales of hay or straw weighing at least 40 lb. per bale. They shall be free from weed seeds and viable parts of prohibited invasive plants listed in Table 3800.1 of pPart AGR 3800and rough or woody materials.

2.6 Tackifiers shall be as included on the Qualified Products List.

2.7 Geotextile filter fabric for silt fence shall be made from polypropylene, polyester, or other approved polymeric chemically stable material and resistant to ultraviolet radiation degradation for at least 12 months. Silt retention capacity shall be no less than 75 percent of silt and suspended solids. The fabric shall meet the following requirements.

Fabric Property	Test Method	Property Requirement*
Grab Tensile Strength (lbs)	ASTM D 4632	100 Minimum
Grab Tensile Elongation (%)	ASTM D 4632	25 Maximum
Puncture Strength (lbs)	ASTM D 4833	60 Minimum
Mullen Burst Strength (psi)	ASTM D 3786	210 Minimum
Trapezoid Tear Strength (lbs)	ASTM D 4533	60 Minimum

*All properties are minimum or maximum average roll values (i.e. the test results for any sampled roll in a lot shall meet or exceed the minimum values or be less than or meet the maximum value in the table.)

2.8 Posts for silt fence shall be either wood or steel. Wood posts shall be sound quality hardwood with a minimum cross sectional area of 1.6 sq. in. Steel post shall be standard T or U section weighing not less than 1 pound per linear ft. with projections for fastening wire to the fence. Maximum post spacing shall be 10 ft.

2.9 Support fence for silt fence, if required, shall be a minimum of 14.5 gauge woven wire with a maximum 6" mesh.

2.10 Erosion stone shall meet the requirements for Item 585.4 Class D stone.

2.11 Erosion Control Mix

2.11.1 Erosion control mix shall be placed to provide for temporary control of erosion or sedimentation, including slope stabilization, check dams and berms, inlet control or where ordered.

2.11.2 The mix shall have an organic portion between 25% and 65%, dry weight basis, and be fibrous and elongated such as from shredded bark, stump grindings, composted bark, or equivalent manufactured products. The mix shall not contain silts, clays, or fine sands.

2.11.3 The mix shall have a pH between 5.0 and 8.0 and a particle size by weight of 100% passing a 3-inch screen, 90% to 100% passing a 1-inch screen, 70% to 100% passing a 0.75-inch screen, and 30% to 75% passing a 0.25-inch screen.

Construction Requirements

3.1 General

3.1.1 Prior to the start of any land disturbance activities, the Contractor shall submit four sets of the Storm Water Pollution Prevention Plan (SWPPP) described in 3.2 for approval in accordance with 105.02 for clearing, grubbing, grading, drainage and bridge structures, especially in or adjacent to existing waters, water courses and wetlands. The Department's review time will be proportional to the complexity of the SWPPP and will be within 15 working days. No work requiring erosion/ sediment control shall commence until the SWPPP has been approved. Names of designated personnel to perform field monitoring shall be included in the submittal. The SWPPP may be submitted in phases or for specific construction areas addressing the maximum open area allowed in section 3.1.4. Only work within areas covered by an approved SWPPP will be allowed to be performed.

3.1.1.1 The Department will secure the necessary NHDES Wetlands or US Army Corps of Engineers permit(s) to accomplish the work indicated on the plans. The Contractor is responsible for obtaining additional Wetlands or Corps of Engineers permit(s) for the Contractor's method of construction.

3.1.2 Permanent and temporary erosion control features shall be incorporated into the project at the earliest practicable time, as specified on the plans, as stated in 107.01, and as outlined in the approved SWPPP. Temporary erosion and sediment control measures shall be used to correct conditions that develop during construction to temporarily control erosion not associated with permanent control features.

3.1.3 When erosion is likely to be a problem, grubbing operations shall be so scheduled and performed that grading operations and permanent erosion control features can follow immediately thereafter.

3.1.4 The maximum amount of allowed disturbed earth material exposed shall not exceed a total of 5 acres for all operations within the right-of-way at any one time. The Contractor may be permitted to exceed the maximum open area allowed, with approval from the Department, provided the Contractor's SWPPP shows adequate provisions to control erosion and sediment, provided the additional area of disturbance is necessary to meet the Contractors Critical Path Method schedule (CPM), and the Contractor can demonstrate there are adequate resources available (equipment & manpower) to respond to multiple events simultaneously. In addition, the SWPPP shall show stabilization procedures for any areas that are inactive for more than fourteen days. The SWPPP shall identify when exposed material will be protected from erosion and when temporary and permanent erosion control measures will be installed.

3.1.5 For the construction period from November 30th through May 1st the area of exposed, unstablized soil shall be limited to one acre. The allowable area of exposed soil may be increased provided a winter construction plan shows adequate provisions to control erosion and sediment, provided the additional area of disturbance is necessary to meet the Contractors Critical Path Method schedule (CPM), and the Contractor can demonstrate there are adequate resources available (equipment & manpower) to respond to multiple events simultaneously and is reviewed and approved by the Department.

3.1.6 The Engineer will limit the area of clearing, grubbing, excavation, borrow and embankment operations commensurate with the Contractor's capability and progress and in no case shall exceed a total of 5 acres without prior approval, in keeping the finish grading, mulching, seeding, erosion and sediment control measures concurrent with operations in accordance with the accepted SWPPP.

3.1.7 Earth excavation and embankment slopes shall be permanently or temporarily treated for stabilization before the time the slant height of exposed slopes reaches 30 ft., unless otherwise approved. Where construction

activities are completed within the growing season, all exposed soil areas shall be permanently stabilized within 3 calendar days. Where construction activities are temporarily suspended or completed outside of the growing season, all exposed soil areas shall be treated for stabilization within 14 calendar days.

3.1.8 An area shall be considered " stabilized" when it is in a condition in which the soils on the site will not erode under the conditions of a 10-year storm.

3.1.9 As work progresses, patch seeding and mulching shall be done as required on areas previously treated to maintain or establish protective cover.

3.1.10 Drainage pipes and ditches shall be constructed in a sequence from outlet to inlet in order to stabilize outlet areas and ditches before water is directed to the new installation or any portion thereof unless conditions unique to the location warrant an alternative method. If this unique condition exists, the alternative method will require written approval.

3.1.11 Channel and ditch work, including erosion protection shall be completed before diverting the drainage to these areas.

3.1.12 In the event of conflict between these requirements and erosion and sediment control laws, rules or regulations of other Federal, State or local agencies, the more restrictive laws, rules or regulations shall apply.

3.1.13 In case of failure on the part of the Contractor to provide and maintain effective temporary erosion and sediment control, as determined by the Engineer, the Department reserves the right to employ outside assistance or to use its own forces to provide the necessary corrective measures.

3.2 Storm Water Pollution Prevention Plan. (SWPPP)

3.2.1 This Item addresses the preparation and implementation of a SWPPP required by the National Pollutant Discharge Elimination System (NPDES) and applicable Construction General Permit (CGP). The SWPPP shall be prepared, stamped and signed by a Licensed Professional Engineer registered in the State of New Hampshire, and a Certified Professional Erosion and Sediment Control Specialist (CPESC), qualified to prepare erosion and sediment control plans, hereinafter called the " Preparer". Collaboration with other professionals such as soil scientists, geologists and environmentalists may be required as appropriate.

3.2.1.1 Qualifications for the SWPPP Preparer include a minimum of 5 years' experience or knowledge of highway and bridge construction operations, with knowledge of methods of construction, demonstrated knowledge of erosion and sediment control, and stormwater management measures. The preparer shall have previously submitted accepted plans to the New Hampshire Department of Environmental Services (NHDES) under RSA 485-A:17 Terrain Alteration, or have prepared accepted plans under the National Pollutant Discharge Elimination System permit program.

3.2.1.2 The Preparer may monitor the SWPPP or designate a representative to monitor the SWPPP. If the Preparer chooses to utilize a representative, the SWPPP Monitor shall be certified as a Certified Erosion Sediment and Storm Water Inspector (CESSWI) with knowledge of methods of construction, demonstrated field knowledge of erosion control measures; their design, effectiveness, and maintenance requirements.

3.2.1.3 The Contractor shall submit the name and qualifications of the person or firm proposed to prepare the SWPPP to the Engineer for approval prior to preparing the SWPPP. Submittal of the name and qualifications will be accepted after the opening of bids.

3.2.2 The Construction General Permit (CGP) also requires the preparation and implementation of a SWPPP in accordance with the afore mentioned statutes and regulations. The SWPPP will include the CGP conditions and detailed descriptions of controls of erosion and sedimentation to be implemented during construction. It is the responsibility of the Contractor to prepare the SWPPP to meet the requirements of the most recently issued CGP. The Contractor shall submit the SWPPP to the Engineer for approval prior to any soil disturbance activities. It is the responsibility of the Contractor to be familiar with the CGP conditions and the conditions of any state Wetlands permit, Water Quality Certification, Corps of Engineers Section 404 Permit and other state and federal environmental permits applicable to this project and to include in the SWPPP the means and methods necessary to comply with applicable conditions of said permits.

It is the responsibility of the Contractor to complete the SWPPP in accordance with the EPA Construction General Permit, provide all information required, and obtain any and all certifications as required by the

Construction General Permit. Any amendments to the SWPPP required by site conditions, schedule changes, revised work, construction methodologies, and the like are the responsibility of the Contractor. Amendments will require the approval of the Engineer prior to implementation.

The Contractor is responsible for preparation of the SWPPP, all SWPPP certifications, inspections, reports and any and all corrective actions necessary to comply with the provisions of the CGP.

3.2.2.1 A schedule of construction phasing, including maximum open area allowed, and a schedule for monitoring and maintaining the SWPPP shall also be included. BMP's for seasonal (i.e. cold weather/frozen ground, from November 30th through May 1st) applications shall be identified. The construction phasing shall address the various erosion and sediment control and storm water management measures to be implemented at each phase of construction. Phases shall be as shown on the Traffic Control Plan, Prosecution of Work, or as required by the Contractor's approved construction sequence plan.

3.2.2.2 Turbidity limitations in receiving waters noted in 107.01 shall be addressed in the SWPPP.

3.2.2.3 Department plan drawings will show the construction site(s) conditions prior to and after construction by including property lines, right-of-way lines, easements, existing and new structures, drainage, flood plains, wetlands, limits of clearing and grading, proposed final drainage, detours, permanent erosion and sediment control measures, and other critical items. The Contractor's plan drawings shall show temporary drainage and erosion and sediment control measures for the construction site(s) on the Contract plans provided by the Department. Additionally, the Contractor shall provide plans showing all of the above items for proposed areas related to the construction site(s) not shown on the Department's Contract plans, including but not limited to, access and haul roads, equipment and material storage sites, material pits, material processing sites, and disposal areas, except municipally authorized landfill areas and commercial sites. Waste materials are quite often materials unsuitable for embankment construction and generally very susceptible to erosion; therefore, the Contractor shall pay close attention to controlling erosion of these materials.

3.2.2.4 Additional design typicals illustrating practices for erosion and sediment control not shown on the Department plans shall be included in the SWPPP. Calculations shall be included to verify all erosion and sediment control and stormwater management practices such as, but not limited to, sediment retention and detention basins, energy dissipaters, diversions, waterways, and control of runoff.

3.2.3 The Preparer or the Preparer's designated representative shall assist the Contractor in implementing the SWPPP, monitor the site for compliance with the SWPPP and recommend modifications to the SWPPP for changing operations or inadequate erosion and sediment control and stormwater management measures and shall attend weekly (or as required by the Engineer) meetings. The Preparer shall make modifications to the SWPPP as necessary and resubmit for review and approval in accordance with 3.1.1. Review time of modifications will be within 10 working days of submittal.

3.2.3.1 Monitoring SWPPP and Erosion and Sediment Control shall include on-site reviews, weekly (at least once every 7 days) and within 24 hours after any storm event greater than 0.25" of rain per 24 hour period and producing meeting minutes of the weekly meetings for distribution as required. A monitoring report prepared by the SWPPP Monitor shall include the following:

- inspection date
- name
- title
- qualifications and signature of person performing the inspection
- weather information for the period since the last inspection
- weather information at the time of inspection
- list of site deficiencies or non-compliance issues
- locations and description of any discharges
- a summary of construction activities undertaken during the reporting period
- general site conditions
- erosion control maintenance and corrective actions taken
- the anticipated schedule of construction activities for the next reporting period
- any SWPPP amendments
- representative photographs

The weekly on-site review shall be conducted only when the Contractor's personnel are on site. Should any deficiencies or non-compliance issues be found, corrective action shall be performed in accordance with the USEPA and Construction General Permit (CGP). The SWPPP Monitor shall report any deficiencies or non-compliant issues to the Contractor and Engineer prior to exiting the site.

Within 24 hours of completing the on-site review, the SWPPP Monitor shall provide a formal written copy of the monitoring report to the Engineer to be maintained on file with the SWPPP at the project site.

3.2.3.2 The Engineer may order modifications to the SWPPP for changing operations or for inadequate erosion and sediment control and stormwater management measures. Changes and/or modifications shall be noted by the SWPPP Preparer on the approved SWPPP located at the project site.

3.2.3.3 The Preparer of the SWPPP shall be available for on-site consultations with the Engineer within 24 hours of request.

3.2.4 Project work may be suspended, wholly or in part, with no extension of time or additional compensation for failure to implement and maintain the approved SWPPP, including modifications, in accordance with 105.01.

3.3 Mulch

3.3.1 Mulching shall be done immediately after each area has been properly prepared. When seed for erosion control is sown prior to placing the mulch, the mulch shall be placed on the seeded areas within 48 hours after seeding. Hay that has been thoroughly fluffed shall be applied at approximately, but not to exceed 3 tons per acre unless otherwise ordered. Blowing chopped hay mulch will be permitted provided the Contractor controls the mulching operation so as not to infringe on property owners or the traveling public. Hay mulch shall be applied in such a manner that results in a minimum amount of matting that would not retard the vegetative growth. Hay mulch should cover the ground enough to shade it, but the mulch should not be so thick as to cover the ground completely. Matted or bunches of mulch shall be removed or otherwise remedied.

3.3.1.1 Temporary mulching shall be done on areas that are disturbed per 3.1.6. Hay shall be applied at a minimum of 3.2 tons per acre unless otherwise ordered. Blowing chopped hay mulch will be permitted provided the Contractor controls the mulching operation so as not to infringe on property owners or the traveling public. Tackifiers shall be utilized with temporary mulch.

3.3.2 In order to prevent mulch from being blown away, a light covering of loose branches or approved tackifier shall be employed. Unless otherwise ordered, loose branches shall be removed prior to Acceptance of the Work.

3.3.3 All baling wire or rope, such as that used in the shipment of mulch shall be disposed of outside the limits of the project in approved areas.

3.3.4 Bark mulch shall be placed on the designated areas to the depth specified on the plans or as ordered.

3.3.5 On areas treated with bark mulch, the Contractor shall remove weeds and plant material as directed.

3.4 Rolled Erosion Control Products (RECP)

3.4.1 Rolled Erosion Control Products (RECP), of the type specified, shall be installed where shown on the plans or as directed by the Engineer.

3.4.2 RECPs for slope and channel stabilization shall be installed as per the manufacturer's recommendations for the specific application and site conditions, or as directed by the Engineer. Documentation from the manufacturer describing recommended installation procedures shall be provided to the Engineer at least 10 working days prior to installation.

3.4.3 Surfaces of ditches and slopes to receive RECPs shall conform to the grades and cross sections shown on the plans and shall be finished to a smooth and even condition with all debris, roots, stones, and lumps raked out and removed. Unless otherwise directed, soil shall be prepared, including the application of lime, fertilizer and seed, prior to installation of the specified type of RECP.

3.4.4 The RECP shall be placed so that is in intimate contact with the soil surface over the entire installation. Site conditions may require the use of additional staples to assure that this contact is maintained. The RECP shall not be stretched.

3.4.5 RECPs shall be buried at the top of slope and around the edges of catch basins and other structures or obstructions as recommended by the manufacturer.

3.4.6 In the event that the RECP installation becomes damaged, undermined, or raised off of the soil surface by vegetation, it shall be repaired immediately as per manufacturer's recommendations.

3.5 Seed for Erosion Control.

3.5.1 Seeding, when required, shall be performed as ordered and in accordance with 644.3.

3.5.1.1 Areas of the roadside which are to be left temporarily and which will be regraded or otherwise disturbed later during construction may be ordered to be seeded with ryegrass to temporarily stabilize the area. The seed shall be sown at the rate of approximately 1 pound per 1,000 square feet.

3.6 Hay bales for erosion control. Hay bales shall be placed when ordered to provide for temporary control of erosion and/or sediment control and secured with two (2) hardwood stakes. Bales shall be removed or left in place as ordered.

3.7 Silt Fence.

3.7.1 Install and remove the silt fence as shown on the plans and as recommended by the manufacturer.

3.7.1.1 When two sections of silt fence adjoin each other, they shall be overlapped by 6", folded, and stapled at a post.

3.7.1.2 Support fence, when required, shall be fastened securely to the fence posts with staples or wire ties.

3.7.1.3 Filter fabric shall be fastened to the support fence, when support fence is required, with ties spaced every 2 ft. longitudinally at the top, mid-section, and bottom.

3.7.1.4 Silt fence shall be embedded a minimum of 6".

3.7.2 Care shall be taken to maintain the silt fence in a functional condition at all times during the construction period.

3.7.2.1 Silt fences shall be inspected immediately after each rainfall event and at least daily during prolonged rainfall. All deficiencies shall be immediately corrected.

3.7.2.2 Sediment deposits shall be inspected after every storm event and removed when deposits reach approximately 1/3 the height of the silt fence, or when " bulges" develop in the silt fence.

3.7.2.3 Silt fence fabric which has decomposed, has become ineffective or does not retain silt or suspended solids and is still needed, shall be replaced immediately.

3.7.3 Remove the silt fence, support stakes and support fence after all work has been completed and it is no longer needed or as ordered.

3.7.3.1 Sediment deposits shall be removed or left in place, if approved. After the silt fence has been removed, sediment deposits allowed to be left in place shall be graded to conform with the existing topography and shall be vegetated.

3.7.3.2 The silt fence will become the property of the Contractor upon completion of the project, unless otherwise ordered.

3.8 Erosion Stone.

3.8.1 Erosion stone shall be placed to provide for temporary control of erosion or sedimentation including stone check dams, inlet control and stabilized construction entrances or where ordered. Upon acceptance of the Contract, the stone shall be removed as ordered.

3.9 Maintenance.

3.9.1 Erosion control features shall be maintained by the Contractor throughout the life of the project.

Method of Measurement

4.1 Mulch and temporary mulch will be measured by the square yard or by the acre. When measurements are made by the acre, such slope measurements will be made to the nearest 0.01 of an acre.

4.1.1 Bark mulch will be measured by the square yard measured along the slope of the ground.

4.2 Rolled Erosion Control Products (RECP) will be measured by the square yard, based on the dimensions of the exposed surface area of the product.

4.3 Grass seed will be measured by the pound, as specified in 644.4.1.

4.4 Hay bales for erosion control will be measured by the number of bales installed.

4.5 The silt fence will be measured by the linear foot to the nearest 1/2 ft. Measurement will be along the top of the fence for each continuous run in place with no allowance for splices or overlaps.

4.6 Storm Water Pollution Prevention Plan will be measured as a unit. A unit will include preparation, submittals, modifications, and resubmittals.

4.7 Monitoring SWPPP and Erosion and Sediment Controls will be measured to the nearest 1/2 hour, for the actual number of authorized hours spent monitoring the construction site(s) and offsite areas specified in 3.2 and on-site summary monitoring report preparation and distribution. The minimum field time measurement will be 2.0 hours. Monitoring Erosion and Sediment Control will not be measured when there is no item for this work.

4.7.1 Travel time and other time not spent at the construction site(s) or off-site areas specified in 3.2.3.1 and time not authorized will not be measured, except that, with prior authorization, up to 1 hour will be measured for off-site consultation, information review and final recommendation, preparation and distribution of the accepted final Monitoring Report.

4.8 Erosion stone will be measured per ton in accordance with 109.01.

4.9 Erosion Control Mix will be measured per CY in accordance with 109.01.

Basis of Payment

5.1 The accepted quantities of erosion control work will be paid for at the Contract unit price per square yard or per acre for mulch and per square yard for Rolled Erosion Control Products (RECP), complete in place.

5.2 Slope seed ordered for permanent erosion control and ryegrass ordered for temporary erosion control will be paid for as provided under 644.

5.3 Hay bales for erosion control will be paid for at the Item Bid Price per bale complete in place. No extra payment will be made for removal of bales ordered removed.

5.4 Tackifiers approved for use in 3.3.2 will be subsidiary.

5.5 The accepted quantity of silt fence and replacements as ordered will be paid for at the Contract unit price per linear foot installed.

5.5.1 Removing sediment deposits will be paid for under 699.

5.6 The accepted Storm Water Pollution Prevention Plan (SWPPP) will be paid for at the Contract lump sum price. Initial payment will be up to 60 percent of the amount bid upon approval of the SWPPP for the entire project. Subsequent payments will be made periodically based on the anticipated construction period and proposed construction sequence.

5.6.1 Modifications and resubmittals of the plan will be subsidiary.

5.7 The accepted quantities of Monitoring SWPPP and Erosion and Sediment Controls will be paid for at the Contract unit price per hour.

5.7.1 Travel time and other time not spent at the construction site(s) or off-site areas and support services (i.e. travel expenses, clerical staff, copying, miscellaneous expenses, overhead) except as stated in 4.6.1.1,will be subsidiary to Item 645.71.

5.7.2 Erosion and Sediment Control and Stormwater Management items necessary to implement and maintain the Storm Water Pollution Prevention Plan (SWPPP) for the construction site(s) will be paid for under the appropriate Items of 645 or as provided under Section 699.5.

5.8 The accepted quantity of erosion stone will be paid for at the Contract unit price per ton delivered to the project, complete in place, including any required excavation and stone removal, as ordered.

5.9 The accepted quantity of erosion control mix will be paid for at the Contract unit price per CY. delivered to the project, complete in place, including any required stump grinding, excavation, as ordered.

5.10 The Contractor shall maintain areas with permanent control, with no extra compensation, until the completion of the Contract.

5.10.1 Repair and maintenance of damaged or failed slopes, until project acceptance as stated in section.

5.10.2 The Department reserves the right to employ outside assistance or to use its own forces to provide the necessary corrective measures and deduct the cost from money due the Contractor and/or withhold progress payments.

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Pay items and units:

645.111	Mulch	Square Yard
645.11	Mulch	Acre
645.12	Temporary Mulch	Acre
645.15___	Bark Mulch___ in. Deep	Square Yard
645.3	Erosion Stone	Ton
645.41	Temporary Slope Stabilization Type A	Square Yard
645.42	Temporary Slope Stabilization Type B (Wildlife Friendly)	Square Yard
645.43	Temporary Slope Stabilization Type C	Square Yard
645.44	Temporary Slope Stabilization Type D (Wildlife Friendly)	Square Yard
645.54	Permanent Channel Stabilization Type A	Square Yard
645.46	Permanent Channel Stabilization Type B	Square Yard
645.48	Erosion Control Mix	Cubic Yard
645.51	Hay Bales for Temporary Erosion Control	Each
645.52	Ryegrass for Temporary Erosion Control	Pound
645.531	Silt Fence	Linear Foot
645.532	Silt Fence with Support Fence	Linear Foot
645.7	Storm Water Pollution Prevention Plan	Unit
645.71	Monitoring SWPPP and Erosion and Sediment Controls	Hour

DUMMER-CAMBRIDGE-ERROL
16304

June 22, 2018

SPECIAL PROVISION

AMENDMENT TO SECTION 645 – EROSION CONTROL

Item 645.611- Bonded Fiber Matrix (BFM)

This special provision provides for the use of a hydraulically applied Bonded Fiber Matrix as allowable mulch for erosion control and vegetation establishment, to assist in meeting the environmental commitments set forth in the contract documents. This item may be used separately as a soil stabilizer, or in conjunction with Item 646.2 - Turf Establishment without Mulch. This special provision neither amends nor modifies this section, except as specifically noted below.

Description

1.1 The work shall consist of furnishing and installing Bonded Fiber Matrix (BFM) on areas shown on the plans or ordered.

Materials

2.1 Bonded Fiber Matrix (BFM) shall be composed of: long strand, non-toxic, and thermally processed fibers, heated to an appropriate temperature for sterilization purposes; and, water insoluble cross-linked hydro-colloidal tackifiers, that upon drying become insoluble and non-dispersible. Materials composed of paper, cellulose fiber, or a mixture of paper, cellulose, and other materials shall not be used.

2.2 The BFM shall completely biodegrade overtime. Hydraulic Mulch (HM) or Stabilized Mulch Matrix (SMM) shall not be substituted where BFMs are required.

2.3 Seed, lime, and fertilizer if added to the BFM mixture shall be according to the current requirements of Item 646, Turf Establishment.

2.4 BFM shall meet the following requirements: does not dissolve or disperse upon re-wetting; has no germination or growth inhibiting factors and will not form a water-resistant crust.

2.5 BFM components shall be furnished pre-packaged by the manufacturer to assure material performance and compliance with the minimum physical requirements of Table 1 when applied at a rate of 3,500 pounds per acre. Field mixing of additives or components will not be allowed.

Table 1: Minimum BFM Performance and Physical Requirements

BFM Property		**Required Value**
Thermally Processed Fiber by Weight		80% ± 10%
Cross-linked Hydro-Colloidal Tackifiers		10% ± 2%
Moisture Content		10% ± 3%
Organic Matter		90% minimum
Color		Colored to contrast application area, shall not stain concrete or painted surfaces.
BFM Property	**Test Method**	**Required Value**
Physical		
Mass Per Unit Area	ASTM D6566*	10.0 oz/sy minimum
Thickness	ASTM D6525*	0.10 inch minimum
Ground Cover	ASTM D6567*	97% minimum
Water Holding Capacity	ASTM D7367	1000% minimum
Endurance		
Functional Longevity	Observed	Minimum of 6 months
Performance		
Cover Factor	SCDOT Approved Large Scale Testing	0.05 maximum
% Effectiveness	SCDOT Approved Large Scale Testing	95% minimum
Cure time	Observed	24 - 48 hours
Vegetation Establishment	ASTM D7322*	400% minimum

* ASTM test methods developed for Rolled Erosion Control Products (RECPs) that have been modified to accommodate Hydraulic Erosion Control Products (HECPs).

2.6 The BFM shall be listed on the most recent edition of the NHDOT Qualified Products List, Department of Environmental Services Interim Approved Products List, or must meet the physical and performance criteria outlined in this specification and be approved by the Department, prior to incorporating the product into to the Stormwater Pollution Prevention Plan or applying it on site.

Construction Requirements

3.1 The BFM shall be applied to previously prepared and approved surfaces.

3.2 NHDOT shall examine the prepared soil to ensure slope stability, that surface water flow from above slopes has been redirected away from the face of the slope, and that loam or humus has been spread in such a manner as to create a loose, friable seedbed, in areas where BFM is to be combined with turf establishment. The Contractor shall not install slope stabilization materials until any unsatisfactory conditions, have been corrected.

3.3 The Contractor shall only use personnel or subcontractors trained by the manufacturer. Mixing and application of materials must comply with the manufacture's specifications.

3.4 Apply BFM to the soil surface from at least two opposing directions, in thin and successive layers, to achieve an even coverage of all exposed soil surfaces. Do not apply the BFM within 24 hours of a predicted rain event, or under saturated soil conditions.

3.5 Install BFM materials at the general application rates of Table 2, unless otherwise directed by the Department.

Table 2: BFM Installation Requirements

Condition	Maximum Continuous Slope Length (ft)	Temporary Cover by Mulch (no seed) Application Rate (lbs/acre)	Temporary Cover by Seeding Application Rate (lbs/acre)	Permanent Cover Application Rate (lbs/acre)
4:1 Slope	70	2,500	1,500	2,500
3:1 Slope	60	3,000	1,800	3,000
2:1 Slope	50	3,500	2,000	3,500
1:1 Slope	35	4,000	2,500	Not Applicable

3.6 Inspection and Maintenance: Reapplication will be required if the BFM treated soils are disturbed or turbidity or water quality testing shows the need for an additional application within a required effective period of six (6) months.

3.7 Upon request by the CA, a manufacturer's representative shall be on-site to oversee and approve the BFM installation. If reapplication is required due to damage or inappropriate installation cost will not be reimbursed.

Method of Measurement

4.1 The quantity for the pay item Bonded Fiber Matrix (BFM) shall be measured by the pound based upon the delivery slips and tags furnished to the Engineer, but not to exceed the rate specified or ordered.

Basis of Payment

5.1 Payment under this item will be made at the contract unit price per pound.

5.1.1 Seed, lime and fertilizer, if ordered, will be paid under Item 646.2 – Turf Establishment without Mulch. If this item is not included in the contract, this work will be paid in accordance with 109.04.

Pay item and unit:

645.611 Bonded Fiber Matrix (BFM) Pound (Lb)

03/10/02

DUMMER-CAMBRIDGE-ERROL
16304

June 22, 2018

SPECIAL PROVISION

AMENDMENT TO SECTION 645 -- EROSION CONTROL

Item 645.119 – Mulch with Tackifiers

Amend 2.6 to read:

2.6 Mulch Tackifiers as shown on the Department's Qualified product list and that are environmentally non-toxic may be used.

Amend 3.1.2 to read:

3.1.2 Mulch Tackifiers are to be uses as a tie-down or adhesive for mulch, it shall be used at the rate specified by the manufacturer and applied uniformly over and through the mulch.

Add to Pay Items and Units:

645.119	Mulch with Tackifiers	Acre

SECTION 646 -- TURF ESTABLISHMENT

Description

1.1 This work shall consist of preparing the soil and furnishing and applying seed of the type or types specified, fertilizer, limestone, and mulch if required, on all areas designated for turf establishment as shown on the plans or ordered.

1.2 This work shall also consist of furnishing and placing humus or loam as specified in the item description.

Materials

2.1 Limestone shall conform to 642.2.

2.2 Fertilizer shall be that for initial fertilization and shall conform to 643.2.

2.3 Seed shall conform to 644.2 using the type of mixture(s) ordered.

2.4 Mulch shall conform to 645.2.1.

2.5 Mulch tackifiers shall conform to 645.2.6 and be environmentally non-toxic.

2.6 Humus shall conform to 647.2.

2.7 Loam shall conform to 641.2.

Construction Requirements

3.1 Construction requirements shall conform to 641.3, 643.3, 644.3, 645.3 and 647.3.

3.2 Application rate of limestone shall generally be 130 pounds per 1,000 square feet, approximately 3 tons per acre, unless otherwise ordered.

3.3 Mulch tackifiers shall be used as a tie-down or adhesive for mulch, it shall be used at the rate specified by the manufacturer, and applied uniformly over and through the mulch.

Method of Measurement

4.1 Turf establishment of the type specified will be measured by the acre or the square yard to the nearest 0.01 of an acre or nearest square yard from measurements taken on the ground surface covered.

4.2 Turf establishment (F) of the type specified will not be measured, but shall be the square yard final pay quantity in accordance with 109.11 for the area within the limits shown on the plans.

Basis of Payment

5.1 The accepted quantities of turf establishment of the type specified will be paid for at the Contract unit price per acre or square yard complete in place.

5.2 Turf establishment (F) of the type specified are final pay quantity items and will be paid for at the Contract unit price per square yard in accordance with 109.11.

5.3 The material cost of crownvetch seed ordered by the Engineer added to slope seed type specified in the plans will be paid for in accordance with 109.04.

Pay items and units:

646.3	Turf Establishment with Mulch and Tackifiers	Acre
646.31	Turf Establishment with Mulch and Tackifiers	Square Yard
646.311	Turf Establishment with Mulch and Tackifiers (F)	Acre
646.312	Turf Establishment with Mulch and Tackifiers (F)	Square Yard
646.4	Turf Establishment with Mulch, Tackifiers and Humus	Acre
646.41	Turf Establishment with Mulch, Tackifiers and Humus	Square Yard
646.411	Turf Establishment with Mulch, Tackifiers and Humus (F)	Acre
646.412	Turf Establishment with Mulch, Tackifiers and Humus (F)	Square Yard
646.5	Turf Establishment with Mulch, Tackifiers and Loam	Acre
646.51	Turf Establishment with Mulch, Tackifiers and Loam	Square Yard
646.511	Turf Establishment with Mulch, Tackifiers and Loam (F)	Acre
646.512	Turf Establishment with Mulch, Tackifiers and Loam (F)	Square Yard

SUPPLEMENTAL SPECIFICATION

AMENDMENT TO SECTION 645 – EROSION CONTROL

The purpose of this Supplemental Specification is to update erosion control requirements.

Replace 1.1 with the following:

1.1 Erosion Control Products. This work shall consist of furnishing and placing hay mulch, bark mulch, "Rolled Erosion Control Products" (RECP), or other material to provide soil stabilization and/or erosion control on slopes or in channels/ditches at locations shown on the plans or where ordered.

1.1.1 Temporary Slope Matting Type A (Not Currently Used)

1.1.2 Temporary Slope Matting Type B (Wildlife Friendly) shall be a biodegradable RECP specified for protection of slopes of 3:1 or flatter. These products shall maintain their functional integrity for a minimum of 3 months and then biodegrade.

1.1.3 Temporary Slope Matting Type C (Not Currently Used)

1.1.4 Temporary Slope Matting Type D (Wildlife Friendly) shall be a biodegradable RECP specified for protection of slopes of 2:1 or flatter. These products shall maintain their functional integrity for a minimum of 12 months and then biodegrade.

1.1.5 Permanent Channel Matting Type A shall be a RECP specified for protection of vegetated channels/ditches with a slope profile of 5% or less. These products are considered to be permanent and shall be non-degradable.

1.1.6 Permanent Channel Matting Type B (Not Currently Used)

1.1.7 Temporary Channel Matting Type A (Wildlife Friendly) shall be an extended term RECP specified for protection of vegetated channels/ditches with a slope profile of 3% or less. These products are considered temporary and shall have a functional longevity of 24 months.

1.1.8 Temporary Channel Matting Type B shall be a long term RECP specified for protection of vegetated channels/ditches with a slope profile of 3% to 5%. These products are considered temporary and shall have a functional longevity of 36 months.

Replace the Pay Items with the following:

Pay items and units:

645.11	Mulch	Acre
645.111	Mulch	Square Yard
645.12	Temporary Mulch	Acre
645.15__	Bark Mulch___ in. Deep	Square Yard
645.3	Erosion Stone	Ton
645.42	Temporary Slope Matting Type B (Wildlife Friendly)	Square Yard
645.44	Temporary Slope Matting Type D (Wildlife Friendly)	Square Yard
645.45	Permanent Channel Matting Type A	Square Yard
645.471	Temporary Channel Matting Type A (Wildlife Friendly)	Square Yard
645.472	Temporary Channel Matting Type B	Square Yard
645.48	Erosion Control Mix	Cubic Yard
645.51	Hay Bales for Temporary Erosion Control	Each
645.52	Ryegrass for Temporary Erosion Control	Pound
645.531	Silt Fence	Linear Foot
645.532	Silt Fence with Support Fence	Linear Foot
645.7	Storm Water Pollution Prevention Plan	Unit
645.71	Monitoring SWPPP and Erosion and Sediment Controls	Hour

DUMMER-CAMBRIDGE-ERROL
16304

June 22, 2018

SPECIAL PROVISION

AMENDMENT TO SECTION 646 – TURF ESTABLISHMENT

Item 646.2_ – Turf Establishment without Mulch

This special provision provides for the use of the item Turf Establishment without Mulch. This new item will be used with other strategies such as Bonded Fiber Matrix (BFM), Hydraulic Mulch (HM), Stabilized Mulch Matrix (SMM), Fiber Reinforced Matrix (FRM), Temporary Slope Stabilization Type D, and Mulch with Tackifiers which are reimbursed under other items within the contract. This special provision neither amends nor modifies this section, except as specifically noted below.

Description

1.1 This work shall consist of preparing the soil and furnishing and applying seed of the type or types specified, fertilizer, tackifiers, and limestone, on all areas designated for turf establishment as shown on the plans or ordered.

Materials

2.1 Limestone shall conform to 642.2.

2.2 Fertilizer shall be that for initial fertilization and shall conform to 643.2

2.3 Seed shall conform to 644.2 using the type of mixture(s) ordered.

2.4 Tackifiers shall be as included on the Qualified Products List.

Construction Requirements

3.1 Construction requirements shall conform to 642.3, 643.3, 644.3, and 647.3.

Method of Measurement

4.1 Turf establishment of the type specified will be measured by the acre or square yard to the nearest 0.01 of an acre or nearest square yard from measurements taken on the ground surfaced covered.

Basis of Payment

5.1 The accepted quantities of turf establishment of the type specified will be paid for at the Contract unit price per acre or square yard complete in place.

Pay items and units:

646.2	Turf Establishment without Mulch	Acre
646.21	Turf Establishment without Mulch	Square Yard

SECTION 643 -- FERTILIZER FOR GRASSES

Description

1.1 This work shall consist of furnishing and applying an initial application of fertilizer on a new surface and one or more refertilizations after the growth has progressed sufficiently, all as shown on the plans or as ordered.

Materials

2.1 Fertilizer shall be a standard commercial grade fertilizer conforming to all State and Federal rules and regulations and to the standards of the Association of Official Agricultural Chemists. The analysis shall represent respective percentages of nitrogen, phosphoric acid, and potash.

2.1.1 Except as permitted, the analysis ratio shall be 1:1:1 for initial application and 3:1:2 for refertilization application. The analyses in Table 643-1 are preferred. Permission to furnish fertilizer with an analysis varying from Table 643-1 will be based upon reasons given in writing by the Contractor requesting such variances.

Table 643-1 - Fertilizer Information

Percent of Nutrients		Minimum Application Rate	Measurement
Initial	Refertilization	Lbs Per 1,000 ft^2	Factor
10-10-10		20.0	1.0
15-15-15		13.4	1.5
19-19-19		10.5	1.9
	10-3-6	20.0	1.0
	12-2-8	16.7	1.2
	12-4-8	16.7	1.2

2.1.2 A minimum of 30 percent of the nitrogen in fertilizer used for refertilization shall be water insoluble (WIN).

2.2 All fertilizer shall be identified by labels and shall show the following:

(a) Guaranteed analysis.
(b) Name and address of the guarantor of the fertilizer.
(c) Type or brand.
(d) Net weight.

2.2.1 When furnished as a liquid, the fertilizer shall be delivered in an appropriate container or vehicle, and shall conform to the pertinent sections of the Fertilizer Rules and Regulations issued by the New Hampshire Department of Agriculture.

Construction Requirements

3.1 Fertilizer shall be uniformly applied by either the dry or hydraulic method specified in 644.3.5. When the dry method is used, special care shall be taken to thoroughly work the fertilizer into the soil.

3.1.1 The rate of application shall be based upon the nitrogen content and shall be a rate between 2.0 and 2.2 pounds of nitrogen per 1,000 square feet. See Table 643-1 for typical application rates.

3.2 Unless otherwise ordered, not less than three months shall elapse between the initial fertilization and the refertilization. No refertilization ordinarily will be allowed between November 1, or when the ground has frozen, and the following April 1, or between June 1 and the following September 1. Refertilization will be allowed between August 15 and 31 only when it is determined that the permanent grasses have developed well and few weeds have appeared, and such refertilization will not tend to promote the growth of noxious weeds.

Method of Measurement

4.1 Fertilizer will be measured by the pound or by the ton, and in accordance with 109.01, on the basis of weight slips or delivery slips forwarded to the Engineer, but not to exceed the maximum rate specified or ordered. Measurements by the ton will be made to the nearest 0.01 of a ton.

4.1.1 The quantity for payment will be the product of the accepted quantity used and the appropriate measurement factor from Table 643-1.

Basis of Payment

5.1 The accepted quantity of fertilizer will be paid for at the Contract unit price per pound or per ton complete in place.

Pay items and units:

643.11	Fertilizer for Initial Application	Pound
643.12	Fertilizer for Initial Application	Ton
643.21	Fertilizer for Refertilization	Pound
643.22	Fertilizer for Refertilization	Ton

SECTION 644 -- GRASS SEED

Description

1.1 This work shall consist of furnishing and sowing grass seed as shown on the plans or as ordered.

Materials

2.1 General.

2.1.1 Grass seed shall meet the requirements of the New Hampshire Agricultural and Vegetable Seeds Law. As specified in the law, the mixture shall include no " primary noxious weed seeds".

2.1.2 Grass seed of the specified mixtures shall be furnished in fully labeled, standard, sealed containers. Official seed tags and shipment invoices from seed suppliers shall be furnished to the Engineer with each seed delivery on the project.

2.1.3 Percent germination and purity of each seed type in the mixture and weed seed content of the mixture shall be clearly stated on the label.

2.1.4 Seed shall be subject to the testing provisions of the Association of Official Seed Analysts. The month and year of test shall be clearly stated on the label.

2.1.5 Seed may be tested after it has been delivered to the project to verify the seed tag information.

2.1.6 Seed which has become wet, moldy, or otherwise damaged will not be acceptable.

2.2 Park seed Type 15 shall be used on loam areas. This seed mixture shall conform to Table 644-1.

Table 644-1 - Park Seed Type 15

Kind of Seed	Minimum Purity (%)	Minimum Germination (%)	Pounds/Acre (Total 120 lbs)
Creeping Red Fescue[c]	96	85	40
Perennial Ryegrass[a]	98	90	50
Kentucky Bluegrass[b]	97	85	25
Redtop	95	80	5

2.3 Slope seed (WF) Type 45 shall be used for all slope work and shall conform to Table 644-2 unless amended by the Engineer to suit special local conditions encountered.

Table 644-2 – Slope Seed (WF) Type 45

Kind of Seed	Minimum Purity (%)	Minimum Germination (%)	Pounds/Acre (Total 95 lbs)
Creeping Red Fescue [c]	96	85	35
Perennial Ryegrass [a]	98	90	30
Redtop	95	80	5
Alsike Clover	97	90 [e]	5
Birdsfoot Trefoil [d]	98	80 [e]	5
Lance-Leaved Coreopsis	95	80	4
Oxeye Daisy	95	80	3
Blackeyed Susan	95	80	4
Wild Lupine	95	80	4

2.3.1 Slope seed Type 44 shall only be used where specified on the Plans, or as ordered, and shall conform to Table 644-3.

Table 644-3 - Slope Seed Type 44

Kind of Seed	Minimum Purity (%)	Minimum Germination (%)	Pounds/Acre (Total 80 lbs)
Creeping Red Fescue[c]	96	85	35
Perennial Ryegrass[a]	98	90	30
Redtop	95	80	5
Alsike Clover	97	90 [(e)]	5
Birdsfoot Trefoil[d]	98	80 [(e)]	5

NOTES TO TABLES 1, 2 & 3:

[a] Ryegrass shall be a certified fine-textured variety such as Pennfine, Fiesta, Yorktown, Diplomat, or equal.
[b] Bluegrass shall be a certified variety such as Merion, Baron, Majestic Touchdown, Nugget, Ram One, or equal.
[c] Fescue varieties shall include - Creeping Red and/or Hard Reliant, Scaldis, Koket, or Jamestown.
[d] Empire variety preferred) Inoculum specific to birdsfoot trefoil must be used with this mixture. The inoculum shall be a pure culture of nitrogen-fixing bacteria selected for maximum vitality and the ability to transform nitrogen from the air into soluble nitrates and to deposit them in the soil. The inoculum shall not be used later than the date indicated on the container or later than specified. The inoculum shall be subject to approval.
[e] Includes not more than 10 percent hard seed for alsike clover and not more than 25 percent hard seed for birdsfoot trefoil. If necessary, to meet this requirement, extra seed shall be supplied at no expense to the Department.

Construction Requirements

3.1 General.

3.1.1 In order to prevent unnecessary erosion of newly graded slopes and unnecessary siltation of drainage ways, the Contractor shall carry out erosion control items of work such as seeding and mulching as soon as it has satisfactorily completed a unit or portion of the project, such as a structure, an interchange, or a section of roadway.

3.1.2 When immediate protection of newly graded areas is necessary at a time which is outside of the normal seeding season, hay mulch shall be applied in accordance with 645.3.3, with the seeding done at the same time or done later, or both as ordered.

3.1.2.1 When immediate seeding is required on areas of the roadside which are not to be regraded or disturbed, one of the above specified seed mixtures shall be used as ordered.

3.1.2.2 Areas of the roadside which are to be left temporarily and which will be regraded or otherwise disturbed later during construction may be ordered to be seeded with ryegrass under Item 645.52 to obtain temporary control. Ryegrass shall be spread at the rate of approximately 1 pound per 1,000 square feet.

3.1.3 The Engineer reserves the right to prohibit the use of any equipment that is unsuitable or inadequate for the proper performance of the work. The Contractor must immediately remove all rejected equipment from the project.

3.1.4 When the seed mixture requires an inoculum, the inoculum shall be kept as cool as possible, at all times below 75 °F until used. Inoculated seed shall be protected from exposure to sunlight prior to sowing, and all seed not sown within 24 hours following inoculation shall be properly re-inoculated.

3.1.4.1 When grass seed is to be sown dry and the specific legume seed such as birdsfoot trefoil requiring inoculation is furnished on the project separately from the balance of the seed mixture, the legume seed shall be inoculated using twice the normal quantity recommended by the supplier, and, regardless of the directions by the supplier, the seed shall be treated with a sticking agent to hold the inoculum to the seeds, and then treated with a drying agent. The sticking agent shall consist of a mixture such as 9:1 solution of water and molasses, which shall be thoroughly mixed with the seed at the rate of 1/2 pint per 100 pounds of seed, unless a greater rate is recommended by the supplier. Before mixing the treated seed with the remainder of the seed mixture, a drying agent such as cornstarch shall be added at the rate of approximately 1/2 pound per 100 pounds of seed, unless another rate is specified.

3.1.4.2 When grass seed is to be sown dry and the legume seed is furnished on the project already mixed with the remainder of the seed mixture, 3 times the normal quantity of inoculant recommended by the supplier as sufficient for the quantity of legume in the mixture shall be mixed with the total seed. The sticking agent and the drying agent shall be mixed in the manner and at the rate specified in 3.1.4.1 with sufficient agents to treat the entire mixture.

3.1.4.3 When the seed is to be applied by the use of a hydraulic seeder, at least 4 times the normal amount of the appropriate inoculum, required to inoculate only the legume shall be added to the mixture just before application. See 3.5.2.7.

3.2 Seeding Seasons.

3.2.1 Seeding and initial fertilizing shall be done between April 1 and June 1, between August 15 and October 14, or as permitted. Seeding shall not be done during windy weather or when the ground is frozen, excessively wet, or otherwise untillable. If seeding is done during July or August, additional mulch material may be required by the Engineer.

3.3 Application rates. Unless specifically ordered, seed shall be spread at the rates specified in 2.2, 2.3, and 2.4.

3.4 Preparation.

3.4.1 All areas to be seeded shall be prepared to provide a reasonably firm but friable seed bed.

3.4.1.1 Sloped areas shall not be left too smooth; the surface shall be left in a ruffled condition such as may be produced by the use of tracked vehicles run up and down the slopes. Smooth, compacted slopes, such as may have left from blading, which

might allow the free flow of water down them shall be disked, harrowed, dragged with a chain or mat, machine-raked, or hand-worked as directed to give the effect of miniature terraces, particularly in silty or clayey soils. The slopes shall be left smooth enough to enable mowing.

3.4.1.2 Lawn areas, such as where loam has been spread, shall be prepared for seeding in accordance with 641.3.1.

3.4.2 All areas to be seeded shall meet the specified grades and shall be free of growth and debris.

3.4.3 Care shall be taken to prevent the formation of low places and pockets where water will stand.

3.4.4 Where ryegrass has been planted for temporary erosion control and has not been eliminated prior to the completion of the work, such areas shall be disc-harrowed at least 3" deep and seeded with permanent grasses to prevent the ryegrass from reseeding and becoming competitive with and retarding development of the permanent cover.

3.5 Seeding methods.

Fertilizer, limestone, and mulch material if required, and seed of the type specified may be placed at the locations shown or ordered by one of the following methods, provided an even distribution is obtained.

3.5.1 Dry Method.

3.5.1.1 Power equipment. Mechanical seeders, seed drills, landscape seeders, cultipacker seeders, fertilizer spreaders, or other approved mechanical seeding equipment or attachments may be used when seed, limestone, and fertilizer are to be applied in dry form.

3.5.1.2 Manual equipment. On areas which are inaccessible to power equipment, permission may be given to use hand-operated mechanical equipment when the materials are to be applied in dry form. The use of hand shovels to spread the materials will not be allowed.

3.5.1.3 When the dry method is used, limestone and fertilizer may be mixed together prior to their application, and shall be worked into the soil to the depth of at least 1".

3.5.1.4 Seeding may occur following this procedure.

3.5.1.5 Loamed areas or areas covered with park seed shall be raked, and, unless rolling is ordered omitted, shall be rolled with a roller weighing not more than 100 pounds per foot of roller width to firm the soil but not to pack it. The rolling shall be done the same day as the seeding unless otherwise permitted.

3.5.1.6 Unless otherwise ordered, areas covered with park seed, or slope seed shall be mulched in accordance with Section 645. Private lawns affected by this specification need not be mulched unless it is requested by the landowner.

3.5.2 Hydraulic Method.

3.5.2.1 The application of grass seed, fertilizer, limestone, and a suitable wood fiber mulch shall be accomplished in one operation by use of an approved spraying machine.

3.5.2.2 The materials shall be mixed with water in the machine and kept in an agitated state in order that the materials may be uniformly suspended in the water.

3.5.2.3 The spraying equipment shall be so designed that when the solution is sprayed over an area, the resulting deposits of limestone, fertilizer and grass seed shall be equal in quantity to the required rates.

3.5.2.4 Prior to the start of work, the Engineer shall be furnished with a certified statement for approval as to the number of pounds of materials to be used per 100 gallons of water. This statement shall also specify the number of square feet of seeding that can be covered with the quantity of solution in the hydroseeder.

3.5.2.5 The hydroseeder shall be completely flushed and cleaned each day before seeding is to be started, and shall also be thoroughly flushed of all residue after the completion of application on every 10 acres.

3.5.2.6 If the results of the spray operations are unsatisfactory, the Contractor will be required to abandon this method and apply the materials in accordance with 3.5.1.

3.5.2.7 When inoculum is required, if the inoculum is left in solution with fertilizer longer than 30 minutes, a fresh charge of inoculum (4 times normal) shall be added to the mixture. See 3.1.4.3.

3.5.2.8 When the hydraulic method is used, compaction or rolling will not be required.

3.5.2.9 Except as provided in 3.1.2, unless mulch material required is applied during the seeding operation or within 1/2 hour following the seeding operation, temporary and satisfactory measures to protect the seed from sunlight and heat shall be taken, such as the use of a light brush drag over the seeded areas to stir the seed into the soil. Care shall be taken not to carry the seed ahead.

3.6 Care After Seeding.

3.6.1 The Contractor shall be responsible for protecting and caring for seeded areas until Acceptance of the Work. He shall repair at his own expense any damage to seeded areas caused by pedestrian or vehicular traffic or other causes, except for conditions as covered in 104.13.

3.6.2 If necessary, barricades of brush or other materials and suitable signs shall be placed to protect the seeded areas.

3.6.3 The seeded areas shall be carefully and suitably watered as necessary to produce a satisfactory growth.

3.6.4 Areas seeded with park seed shall be mowed whenever necessary to keep the growth between 3 and 6" in order to allow light to penetrate to the shorter, slower growing species in the mixture. Areas seeded with slope seed may be ordered mowed whenever the Contract extends into a second growing season.

3.6.5 Weeds growing in areas seeded with the slope seed shall be cut back to prevent them from dominating the desired grass plants.

3.7 Liability.

3.7.1 The Contractor shall keep all seeded areas in good repair.

3.7.2 To be acceptable, a stand of grass shall show a reasonably thick, uniform stand, free from sizable areas of thin or bare spots, with a uniform count of at least 100 plants of specified grass per square foot. When applicable, at least 3 birdsfoot trefoil plants per square foot must be visible with the other specified grasses.

3.7.3 Any part of seeded areas which fail to yield an acceptable stand shall be retreated with additional seed, limestone, fertilizer and mulch as ordered at no cost to the Department.

Method of Measurement

4.1 Grass seed shall be measured by the pound based upon the delivery slips and tags furnished the Engineer, but not to exceed the rate specified or ordered.

Basis of Payment

5.1 The accepted quantity of grass seed will be paid for at the Contract unit price per pound of the type specified complete in place.

5.1.1 Seeded areas which need reseeding will be done at the Contractor's expense.

5.2 Hay mulch will be paid for as provided under Section 645.

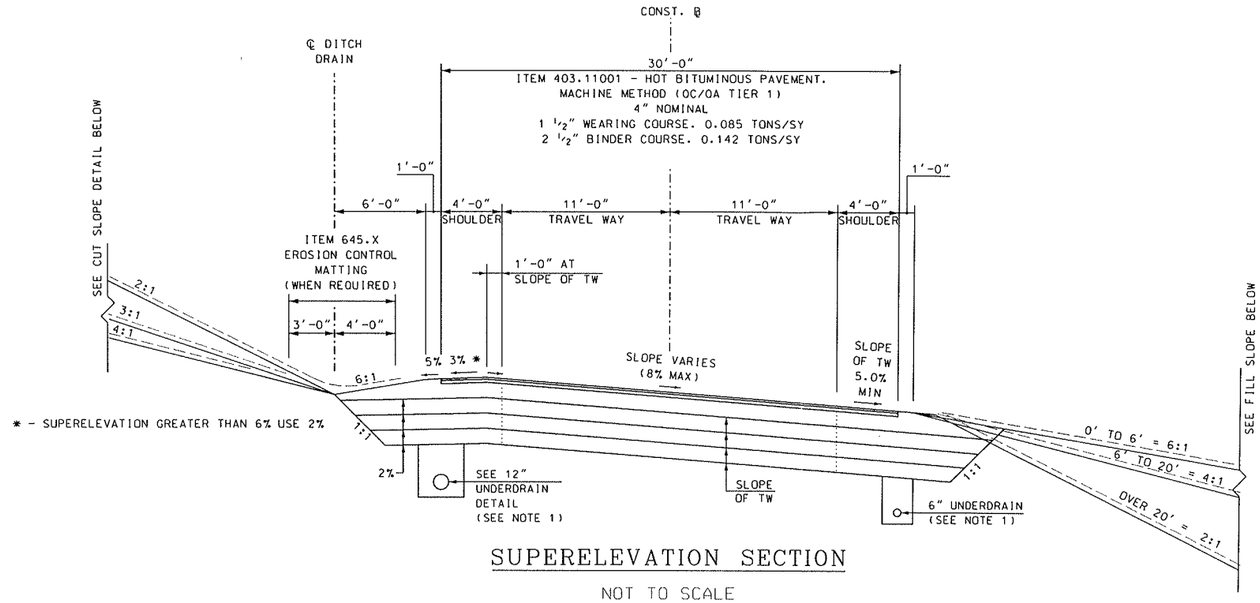
5.3 Limestone will be paid for as provided under Section 642.

5.4 Fertilizer will be paid for as provided under Section 643.

5.5 Ryegrass will be paid for as provided under Section 645.

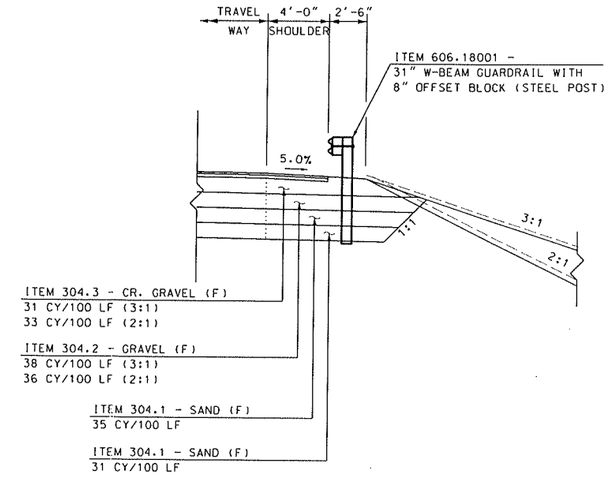
Pay items and units :

644.15	Park Seed Type 15	Pound
644.44	Slope Seed Type 44	Pound
644.45	Slope Seed (WF) Type 45	Pound
644.51	Birdsfoot Trefoil	Pound



SUPERELEVATION SECTION

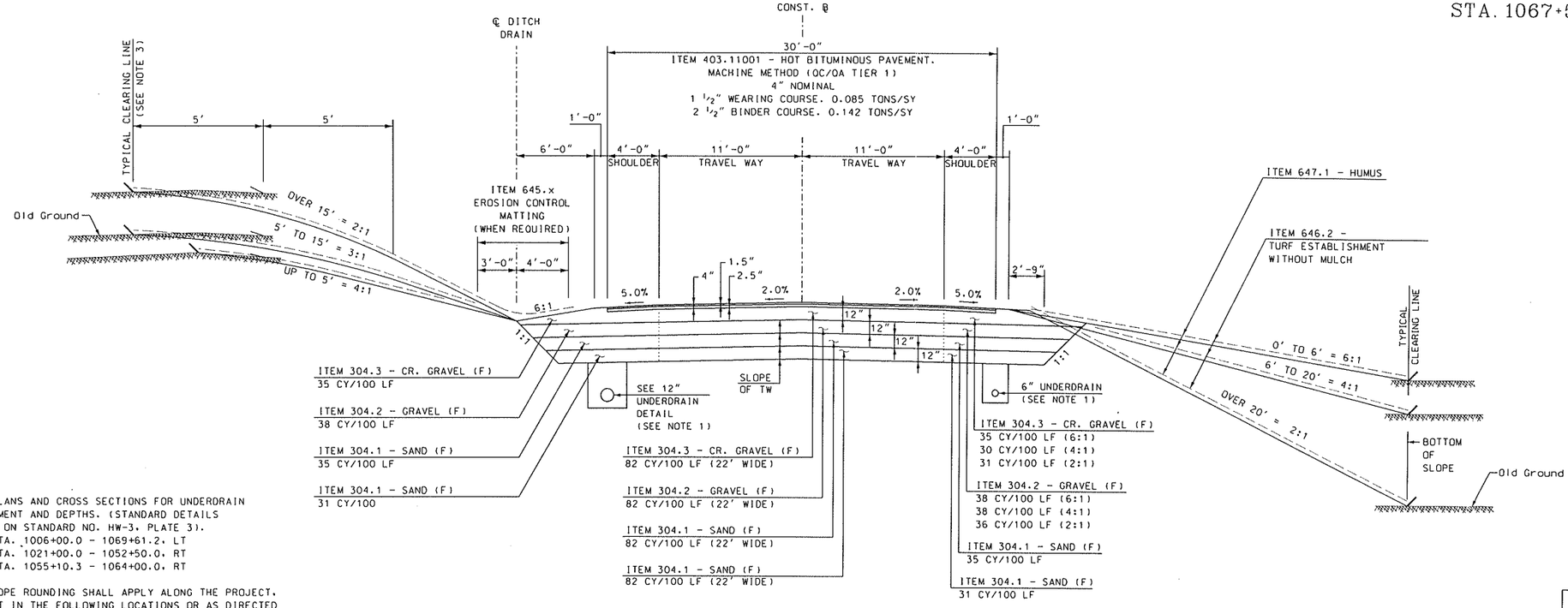
NOT TO SCALE



GUARDRAIL SECTION

NOT TO SCALE

STA. 1012+09.5 - STA. 1019+59.5, RT.
STA. 1067+59.5 - STA. 1076+09.5, RT.



NORMAL CROWN

NOT TO SCALE

NOTES:

1. SEE PLANS AND CROSS SECTIONS FOR UNDERDRAIN PLACEMENT AND DEPTHS. (STANDARD DETAILS SHOWN ON STANDARD NO. HW-3, PLATE 3).
   STA. 1006+00.0 - 1069+61.2, LT
   STA. 1021+00.0 - 1052+50.0, RT
   STA. 1055+10.3 - 1064+00.0, RT

2. NO SLOPE ROUNDING SHALL APPLY ALONG THE PROJECT, EXCEPT IN THE FOLLOWING LOCATIONS OR AS DIRECTED BY THE RESIDENT ENGINEER.
   STA. 1019+00 - 1021+50, LT.
   STA. 1024+50 - 1026+00, LT.
   STA. 1027+00, LT.
   STA. 1030+50, LT.
   STA. 1032+50 - 1033+50, LT.

NUMBER	DATE	STATION	DESCRIPTION

		DATE
NEW DESIGN	S. HILL	11/2017
SHEET CHECKED	F. KOCZALKA	11/2017
AS BUILT DETAILS		DATE

vhb

DATE PLOTTED	VHB PROJECT NO.	MODEL
4/20/2018	52900.16	-

STATE OF NEW HAMPSHIRE

DEPARTMENT OF TRANSPORTATION ∘ BUREAU OF HIGHWAY DESIGN

NH ROUTE 16
TYPICAL SECTIONS

DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
16304TYP.dgn	16304	5	86

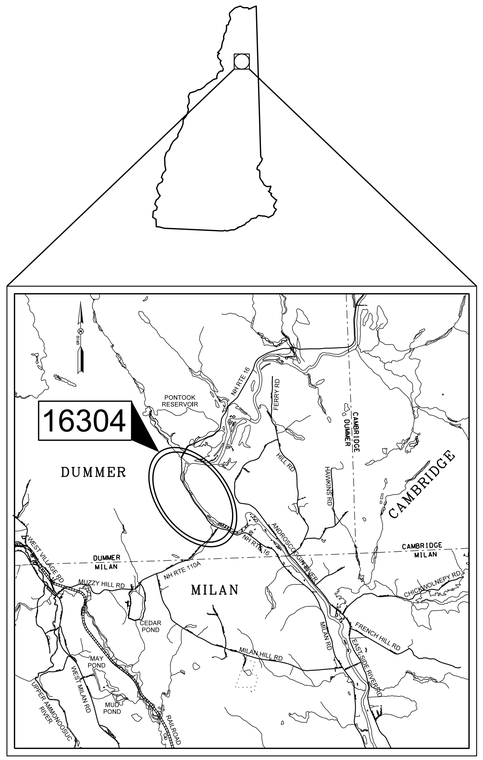
cc: Dummer Municipal Clerk/Conservation Commission
ec: GREGG COMSTOCK, NHDES
MARK KERN, US EPA
CAROL HENDERSON, NH F & G
MICHAEL HICKS, US ACOE
Matt Urban, NHDOT

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION

WETLANDS PLANS
FEDERAL AID PROJECT

X-A001(231)
N.H. PROJECT NO. 16304
NH ROUTE 16

DESIGN DATA	
AVERAGE DAILY TRAFFIC 20 20	1600
AVERAGE DAILY TRAFFIC 20 40	1900
PERCENT OF TRUCKS	8.8%
DESIGN SPEED	50 MPH
LENGTH OF PROJECT	1.27 MILES

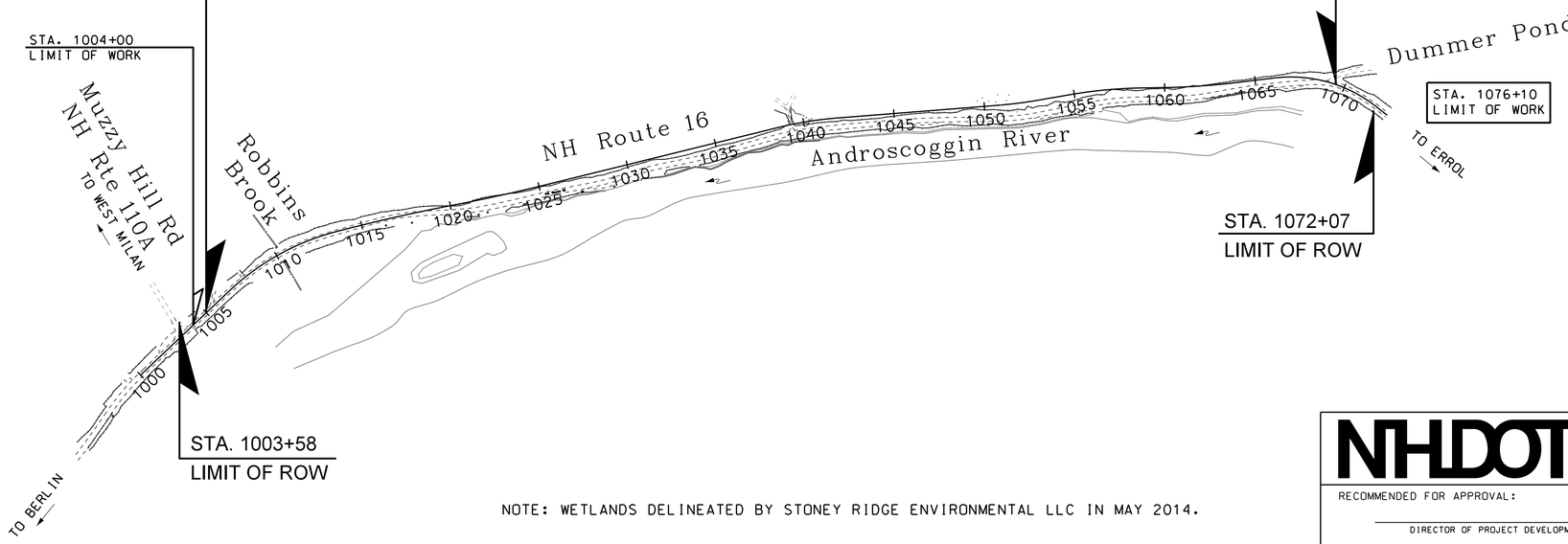


LOCATION MAP

1 ½ 0 1 2 mi.
GRAPHIC SCALE

STA. 1004+97
BEGIN FULL BOX CONSTRUCTION

STA. 1069+50
END FULL BOX CONSTRUCTION



NOTE: WETLANDS DELINEATED BY STONEY RIDGE ENVIRONMENTAL LLC IN MAY 2014.

INDEX OF SHEETS

STATE OF NEW HAMPSHIRE
FRANCIS M. KOCZALKA
No. 10272
LICENSED
PROFESSIONAL ENGINEER

TOWN OF DUMMER
COUNTY OF COOS
SCALE: 1:400

FOR CONSTRUCTION AND ALIGNMENT DETAILS - SEE THE CONSTRUCTION PLANS

DRAWN BY W. DRUDING DATE OCT. 2017
CHECKED BY F. KOCZALKA DATE OCT. 2017

NHDOT THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION

RECOMMENDED FOR APPROVAL:
DIRECTOR OF PROJECT DEVELOPMENT — DATE

APPROVED:
ASSISTANT COMMISSIONER AND CHIEF ENGINEER — DATE

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED:
DIVISION ADMINISTRATOR — DATE

FEDERAL PROJECT NO.	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
X-A001(231)	16304	1	16

GENERAL

EDGE OF PAVEMENT — PROPOSED ROADWAY
TRAVELED WAY — existing roadway — (pavement removed outside slope lines)

DRIVEWAYS — (label surface type)

BUILDINGS — (building to be removed)
(label house or type of building)

FOUNDATION — (label type)

LEACH FIELD — leach field

BRIDGE CROSSINGS — STREAM — OVERPASS

STEPS AND WALK — (label type)

INTERMITTENT WATER COURSE

SHORE LINE — river/stream — pond — (label name of water body)

POTENTIAL WET AREA SYMBOL

BRUSH OR WOODS LINE

TREES (PLANS) — (deciduous) (coniferous) (stump)

TREE OR STUMP (CROSS-SECTIONS) — (show station, circumference in feet & type)

HEDGE — (label type)

MONITORING WELL — mon W

WELL — W

FLAG POLE — fp

ORIGINAL GROUND (TYPICALS)

ROCK OUTCROP

ROCK LINE (TYPICALS & SECTIONS ONLY)

GUARDRAIL (label type) — existing — PROPOSED — bgr — cgr

JERSEY BARRIER

CURB (LABEL TYPE)

STONE WALL

RETAINING WALL (LABEL TYPE) — (points toward retained ground)

FENCE (LABEL TYPE)

SIGNS — (single post) — (double post)

GAS PUMP — gp

FUEL TANK (ABOVE GROUND) — ft — (label size & type)

STORAGE TANK FILLER CAP — fc

SEPTIC TANK — S

GRAVE — gr

MAILBOX — mb

VENT PIPE — vp

SATELLITE DISH ANTENNA — da

PHONE — ph

GROUND LIGHT/LAMP POST — gl — lp

BORING LOCATION — B

TEST PIT — TP

INTERSTATE NUMBERED HIGHWAY — 293

UNITED STATES NUMBERED HIGHWAY — 3

STATE NUMBERED HIGHWAY — 102

SHORELAND - WETLAND

WETLAND DESIGNATION AND TYPE — 2 PUB2E

DELINEATED WETLAND — DW
ORDINARY HIGH WATER — OHW
TOP OF BANK — TOB
TOP OF BANK & ORDINARY HIGH WATER — TOBOHW
NORMAL HIGH WATER — NHW
WIDTH AT BANK FULL — WBF
PRIME WETLAND — PWET
PRIME WETLAND 100' BUFFER — PWET100
NON-JURISDICTIONAL DRAINAGE AREA — NJDA
COWARDIN DISTINCTION LINE — CDL
TIDAL BUFFER ZONE — TBZ
DEVELOPED TIDAL BUFFER ZONE — DTBZ
HIGHEST OBSERVABLE TIDE LINE — HOTL
MEAN HIGH WATER — MHW
MEAN LOW WATER — MLW
VERNAL POOL — VP
SPECIAL AQUATIC SITE — SAS
REFERENCE LINE — REF
WATER FRONT BUFFER — WB50
NATURAL WOODLAND BUFFER — NWB150
PROTECTED SHORELAND — PS250
INVASIVE SPECIES LABEL — I.S. I — I.S. II
INVASIVE SPECIES — INV

FLOODPLAIN / FLOODWAY

500 YEAR FLOODPLAIN BOUNDARY — FP500
100 YEAR FLOODPLAIN BOUNDARY — FP100
FLOODWAY — FW

ENGINEERING

CONSTRUCTION BASELINE — 30 — 31 — 32

PC, PT, POT (ON CONST BASELINE)

PI (IN CONSTRUCTION BASELINES)

INTERSECTION OR EQUATION OF TWO LINES

ORIGINAL GROUND LINE (PROFILES AND CROSS-SECTIONS)

PROFILE GRADE LINE (PROFILES AND CROSS-SECTIONS)

CLEARING LINE — SLOPE LINE

SLOPE LINE

SLOPE LINE (FILL)

SLOPE LINE (CUT)

PROFILES AND CROSS SECTIONS:
ORIGINAL GROUND ELEVATION (LEFT) — 72.5
FINISHED GRADE ELEVATION (RIGHT) — 79.14

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION ◦ BUREAU OF HIGHWAY DESIGN

STANDARD SYMBOLS

REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
11-21-2014	stdsymb1_2.dgn	16304	2	16

DRAINAGE

MANHOLE

CATCH BASIN — cb

DROP INLET — di

(existing) (PROPOSED)

DRAINAGE PIPE (existing) — (label size & type)

DRAINAGE PIPE (PROPOSED)

UNDERDRAIN (existing) W/ FLUSHING BASIN — fb — (label size & type)

UNDERDRAIN (PROPOSED) W/ FLUSHING BASIN

show direction of flow

HEADER (existing & PROPOSED) — (with stone outlet protection)

END SECTION (existing & PROPOSED) — METAL or PLASTIC; RCP

OPEN DITCH (PROPOSED)

EROSION CONTROL/ STONE SLOPE PROTECTION

BOUNDARIES / RIGHT-OF-WAY

RIGHT-OF-WAY LINE — (label type)

RR RIGHT-OF-WAY LINE

PROPERTY LINE

PROPERTY LINE (COMMON OWNER) — Z

TOWN LINE — BOW / CONCORD

COUNTY LINE — COOS / GRAFTON

STATE LINE — MAINE / NEW HAMPSHIRE

NATIONAL FOREST

CONSERVATION LAND — LC

BENCH MARK / SURVEY DISK

BOUND — bnd — (PROPOSED)

STATE LINE/ TOWN LINE MONUMENT — S/L — T/L

NHDOT PROJECT MARKER

IRON PIPE OR PIN — ip

DRILL HOLE IN ROCK — dh

TAX MAP AND LOT NUMBER — 156 / 14 — 1642/341 — 6.80 Ac.±

PROPERTY PARCEL NUMBER — 12

HISTORIC PROPERTY — H

UTILITIES

existing PROPOSED

TELEPHONE POLE

POWER POLE

JOINT OCCUPANCY

MISCELLANEOUS/UNKNOWN POLE

GUY POLE OR PUSH BRACE

(plot point at face not center of symbol)

LIGHT POLE

LIGHT ON POWER POLE

LIGHT ON JOINT POLE

POLE STATUS:
REMOVE, LEAVE, PROPOSED, OR TEMPORARY
AS APPLICABLE e.g.:

R L — P+04 25.0' — T+04 25.0'

RAILROAD — (label ownership)

RAILROAD SIGN

RAILROAD SIGNAL

UTILITY JUNCTION BOX — jb — JB

OVERHEAD WIRE — OW — (label type)

UNDERGROUND UTILITIES

WATER (on existing lines label size, type and note if abandoned) — W — PW

SEWER — S — PS

TELEPHONE — T — PT

ELECTRIC — E — PE

GAS — G — PG

LIGHTING — L — PL

INTELLIGENT TRANSPORTATION SYSTEM — ITS — PITS

FIBER OPTIC — FO — PFO

WATER SHUT OFF

GAS SHUT OFF

HYDRANT

MANHOLES

SEWER — MHS

TELEPHONE — MHT

ELECTRICAL — MHE

GAS — MHG

UNKNOWN

TRAFFIC SIGNALS / ITS

existing PROPOSED

MAST ARM (existing) — 30' MA (NOTE ANGLE FROM ℄)

OPTICOM RECEIVER

OPTICOM STROBE

TRAFFIC SIGNAL

PEDESTAL WITH PEDESTRIAN SIGNAL HEADS AND PUSH BUTTON UNIT

SIGNAL CONDUIT — C — PC

CONTROLLER CABINET — cc — CC

METER PEDESTAL — mp — MP

PULL BOX — pb — PB

LOOP DETECTOR (QUADRUPOLE) — (label size)

LOOP DETECTOR (RECTANGULAR) — (label size)

CAMERA POLE (CCTV)

FIBER OPTIC DELINEATOR — fod — FOD

FIBER OPTIC SPLICE VAULT — SVF

ITS EQUIPMENT CABINET — its — ITS

VARIABLE SPEED LIMIT SIGN

DYNAMIC MESSAGE SIGN

ROAD AND WEATHER INFO SYSTEM

CONSTRUCTION NOTES

CURB MARK NUMBER - BITUMINOUS — B-1

CURB MARK NUMBER - GRANITE — G-1

CLEARING AND GRUBBING AREA — A

DRAINAGE NOTE — 1

EROSION CONTROL NOTE — A

FENCING NOTE — A

GUARDRAIL NOTE — 1

ITS NOTE — 1

LIGHTING NOTE — A

TRAFFIC SIGNAL NOTE — 1

STATE OF NEW HAMPSHIRE

DEPARTMENT OF TRANSPORTATION ∘ BUREAU OF HIGHWAY DESIGN

STANDARD SYMBOLS

REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
9-1-2016	stdsymb1_2.dgn	16304	3	16

EROSION CONTROL STRATEGIES

1. ENVIRONMENTAL COMMITMENTS:
   1.1. THESE GUIDELINES DO NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH ANY CONTRACT PROVISIONS, OR APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS.
   1.2. THIS PROJECT WILL BE SUBJECT TO THE US EPA'S NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) STORM WATER CONSTRUCTION GENERAL PERMIT AS ADMINISTERED BY THE ENVIRONMENTAL PROTECTION AGENCY (EPA). THIS PROJECT IS SUBJECT TO REQUIREMENTS IN THE MOST RECENT CONSTRUCTION GENERAL PERMIT (CGP).
   1.3. THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE NHDES WETLAND PERMIT, THE US ARMY CORPS OF ENGINEERS PERMIT, WATER QUALITY CERTIFICATION AND THE SPECIAL ATTENTION ITEMS INCLUDED IN THE CONTRACT DOCUMENTS.
   1.4. ALL STORM WATER, EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE NEW HAMPSHIRE STORMWATER MANUAL, VOLUME 3, EROSION AND SEDIMENT CONTROLS DURING CONSTRUCTION (DECEMBER 2008) (BMP MANUAL) AVAILABLE FROM THE NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES (NHDES).
   1.5. THE CONTRACTOR SHALL COMPLY WITH RSA 485-A:17, AND ALL, PUBLISHED NHDES ALTERATION OF TERRAIN ENV-WQ 1500 REQUIREMENTS (HTTP://DES.NH.GOV/ORGANIZATION/COMMISSIONER/LEGAL/RULES/INDEX.HTM)
   1.6. THE CONTRACTOR IS DIRECTED TO REVIEW AND COMPLY WITH SECTION 107.1 OF THE CONTRACT AS IT REFERS TO SPILLAGE, AND ALSO WITH REGARDS TO EROSION, POLLUTION, AND TURBIDITY PRECAUTIONS.

2. STANDARD EROSION CONTROL SEQUENCING APPLICABLE TO ALL CONSTRUCTION PROJECTS:
   2.1. PERIMETER CONTROLS SHALL BE INSTALLED PRIOR TO EARTH DISTURBING ACTIVITIES. PERIMETER CONTROLS AND STABILIZED CONSTRUCTION EXITS SHALL BE INSTALLED AS SHOWN IN THE BMP MANUAL AND AS DIRECTED BY THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP) PREPARER.
   2.2. EROSION, SEDIMENTATION CONTROL MEASURES AND INFILTRATION BASINS SHALL BE CLEANED, REPLACED AND AUGMENTED AS NECESSARY TO PREVENT SEDIMENTATION BEYOND PROJECT LIMITS THROUGHOUT THE PROJECT DURATION.
   2.3. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED IN ACCORDANCE WITH THE CONSTRUCTION GENERAL PERMIT AND SECTION 645 OF THE NHDOT SPECIFICATIONS FOR ROAD AND BRIDGES CONSTRUCTION.
   2.4. AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED:
      (A) BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED;
      (B) A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED;
      (C) A MINIMUM OF 3" OF NON-EROSIVE MATERIAL SUCH AS STONE OR RIP-RAP HAS BEEN INSTALLED;
      (D) TEMPORARY SLOPE STABILIZATION CONFORMING TO TABLE 1 HAS BEEN PROPERLY INSTALLED
   2.5. ALL STOCKPILES SHALL BE CONTAINED WITH A PERIMETER CONTROL. IF THE STOCKPILE IS TO REMAIN UNDISTURBED FOR MORE THAN 14 DAYS, MULCHING WILL BE REQUIRED.
   2.6. A WATER TRUCK SHALL BE AVAILABLE TO CONTROL EXCESSIVE DUST AT THE DIRECTION OF THE CONTRACT ADMINISTRATOR.
   2.7. TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES SHALL REMAIN UNTIL THE AREA HAS BEEN PERMANENTLY STABILIZED.
   2.8. CONSTRUCTION PERFORMED ANY TIME BETWEEN NOVEMBER 30" AND MAY 1" OF ANY YEAR SHALL BE CONSIDERED WINTER CONSTRUCTION AND SHALL CONFORM TO THE FOLLOWING REQUIREMENTS.
      (A) ALL PROPOSED VEGETATED AREAS WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15", OR WHICH ARE DISTURBED AFTER OCTOBER 15", SHALL BE STABILIZED IN ACCORDANCE WITH TABLE 1.
      (B) ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15", OR WHICH ARE DISTURBED AFTER OCTOBER 15", SHALL BE STABILIZED TEMPORARILY WITH STONE OR IN ACCORDANCE WITH TABLE 1.
      (C) AFTER NOVEMBER 30" INCOMPLETE ROAD SURFACES, WHERE WORK HAS STOPPED FOR THE SEASON, SHALL BE PROTECTED IN ACCORDANCE WITH TABLE 1.
      (D) WINTER EXCAVATION AND EARTHWORK SHALL BE DONE SUCH THAT NO MORE THAN 1 ACRE OF THE PROJECT IS WITHOUT STABILIZATION AT ONE TIME, UNLESS A WINTER CONSTRUCTION PLAN HAS BEEN APPROVED BY NHDOT THAT MEETS THE REQUIREMENTS OF ENV-WQ 1505.02 AND ENV-WQ 1505.05.
      (E) A SWPPP AMENDMENT SHALL BE SUBMITTED TO THE DEPARTMENT, FOR APPROVAL, ADDRESSING COLD WEATHER STABILIZATION (ENV-WQ 1505.05) AND INCLUDING THE REQUIREMENTS OF NO LESS THAN 30 DAYS PRIOR TO THE COMMENCEMENT OF WORK SCHEDULED AFTER NOVEMBER 30".

GENERAL CONSTRUCTION PLANNING AND SELECTION OF STRATEGIES TO CONTROL EROSION AND SEDIMENT ON HIGHWAY CONSTRUCTION PROJECTS

3. PLAN ACTIVITIES TO ACCOUNT FOR SENSITIVE SITE CONDITIONS:
   3.1. CLEARLY FLAG AREAS TO BE PROTECTED IN THE FIELD AND PROVIDE CONSTRUCTION BARRIERS TO PREVENT TRAFFICKING OUTSIDE OF WORK AREAS.
   3.2. CONSTRUCTION SHALL BE SEQUENCED TO LIMIT THE DURATION AND AREA OF EXPOSED SOILS.
   3.3. PROTECT AND MAXIMIZE EXISTING NATIVE VEGETATION AND NATURAL FOREST BUFFERS BETWEEN CONSTRUCTION ACTIVITY AND SENSITIVE AREAS.
   3.4. WHEN WORK IS PERFORMED IN AND NEAR WATER COURSES, STREAM FLOW DIVERSION METHODS SHALL BE IMPLEMENTED PRIOR TO ANY EXCAVATION OR FILLING.
   3.5. WHEN WORK IS PERFORMED WITHIN 50 FEET OF SURFACE WATERS (WETLAND, OPEN WATER OR FLOWING WATER), PERIMETER CONTROL SHALL BE ENHANCED CONSISTENT WITH SECTION 2.1.2.1. OF THE 2012 NPDES CONSTRUCTION GENERAL PERMIT.

4. MINIMIZE THE AMOUNT OF EXPOSED SOIL:
   4.1. CONSTRUCTION SHALL BE SEQUENCED TO LIMIT THE DURATION AND AREA OF EXPOSED SOILS. MINIMIZE THE AREA OF EXPOSED SOIL AT ANY ONE TIME. PHASING SHALL BE USED TO REDUCE THE AMOUNT AND DURATION OF SOIL EXPOSED TO THE ELEMENTS AND VEHICLE TRACKING.
   4.2. UTILIZE TEMPORARY MULCHING OR PROVIDE ALTERNATE TEMPORARY STABILIZATION ON EXPOSED SOILS IN ACCORDANCE WITH TABLE 1.
   4.3. THE MAXIMUM AMOUNT OF DISTURBED EARTH SHALL NOT EXCEED A TOTAL OF 5 ACRES FROM MAY 1" THROUGH NOVEMBER 30", OR EXCEED ONE ACRE DURING WINTER MONTHS, UNLESS THE CONTRACTOR DEMONSTRATES TO THE DEPARTMENT THAT THE ADDITIONAL AREA OF DISTURBANCE IS NECESSARY TO MEET THE CONTRACTORS CRITICAL PATH METHOD SCHEDULE (CPM), AND THE CONTRACTOR HAS ADEQUATE RESOURCES AVAILABLE TO ENSURE THAT ENVIRONMENTAL COMMITMENTS WILL BE MET.

5. CONTROL STORMWATER FLOWING ONTO AND THROUGH THE PROJECT:
   5.1. DIVERT OFF SITE RUNOFF OR CLEAN WATER AWAY FROM THE CONSTRUCTION ACTIVITY TO REDUCE THE VOLUME THAT NEEDS TO BE TREATED ON SITE.
   5.2. DIVERT STORM RUNOFF FROM UPSLOPE DRAINAGE AREAS AWAY FROM DISTURBED AREAS, SLOPES, AND AROUND ACTIVE WORK AREAS AND TO A STABILIZED OUTLET LOCATION.
   5.3. CONSTRUCT IMPERMEABLE BARRIERS AS NECESSARY TO COLLECT OR DIVERT CONCENTRATED FLOWS FROM WORK OR DISTURBED AREAS.
   5.4. STABILIZE, TO APPROPRIATE ANTICIPATED VELOCITIES, CONVEYANCE CHANNELS OR PUMPING SYSTEMS NEEDED TO CONVEY CONSTRUCTION STORMWATER TO BASINS AND DISCHARGE LOCATIONS PRIOR TO USE.
   5.5. DIVERT OFF-SITE WATER THROUGH THE PROJECT IN AN APPROPRIATE MANNER SO NOT TO DISTURB THE UPSTREAM OR DOWNSTREAM SOILS, VEGETATION OR HYDROLOGY BEYOND THE PERMITTED AREA.

6. PROTECT SLOPES:
   6.1. INTERCEPT AND DIVERT STORM RUNOFF FROM UPSLOPE DRAINAGE AREAS AWAY FROM UNPROTECTED AND NEWLY ESTABLISHED AREAS AND SLOPES TO A STABILIZED OUTLET OR CONVEYANCE.
   6.2. CONSIDER HOW GROUNDWATER SEEPAGE ON CUT SLOPES MAY IMPACT SLOPE STABILITY AND INCORPORATE APPROPRIATE MEASURES TO MINIMIZE EROSION.
   6.3. CONVEY STORMWATER DOWN THE SLOPE IN A STABILIZED CHANNEL OR SLOPE DRAIN.
   6.4. THE OUTER FACE OF THE FILL SLOPE SHOULD BE IN A LOOSE RUFFLED CONDITION PRIOR TO TURF ESTABLISHMENT. TOPSOIL OR HUMUS LAYERS SHALL BE TRACKED UP AND DOWN THE SLOPE, DISKED, HARROWED, DRAGGED WITH A CHAIN OR MAT, MACHINE-RAKED, OR HAND-WORKED TO PRODUCE A RUFFLED SURFACE.

7. ESTABLISH STABILIZED CONSTRUCTION EXITS:
   7.1. INSTALL AND MAINTAIN CONSTRUCTION EXITS, ANYWHERE TRAFFIC LEAVES A CONSTRUCTION SITE ONTO A PUBLIC RIGHT-OF-WAY.
   7.2. SWEEP ALL CONSTRUCTION RELATED DEBRIS AND SOIL FROM THE ADJACENT PAVED ROADWAYS AS NECESSARY.

8. PROTECT STORM DRAIN INLETS:
   8.1. DIVERT SEDIMENT LADEN WATER AWAY FROM INLET STRUCTURES TO THE EXTENT POSSIBLE.
   8.2. INSTALL SEDIMENT BARRIERS AND SEDIMENT TRAPS AT INLETS TO PREVENT SEDIMENT FROM ENTERING THE DRAINAGE SYSTEM.
   8.3. CLEAN CATCH BASINS, DRAINAGE PIPES, AND CULVERTS IF SIGNIFICANT SEDIMENT IS DEPOSITED.
   8.4. DROP INLET SEDIMENT BARRIERS SHOULD NEVER BE USED AS THE PRIMARY MEANS OF SEDIMENT CONTROL AND SHOULD ONLY BE USED TO PROVIDE AN ADDITIONAL LEVEL OF PROTECTION TO STRUCTURES AND DOWN-GRADIENT SENSITIVE RECEPTORS.

9. SOIL STABILIZATION:
   9.1. WITHIN THREE DAYS OF THE LAST ACTIVITY IN AN AREA, ALL EXPOSED SOIL AREAS, WHERE CONSTRUCTION ACTIVITIES ARE COMPLETE, SHALL BE STABILIZED.
   9.2. IN ALL AREAS, TEMPORARY SOIL STABILIZATION MEASURES SHALL BE APPLIED IN ACCORDANCE WITH THE STABILIZATION REQUIREMENTS (SECTION 2.2) OF THE 2012 CGP. (SEE TABLE 1 FOR GUIDANCE ON THE SELECTION OF TEMPORARY SOIL STABILIZATION MEASURES.)
   9.3. EROSION CONTROL SEED MIX SHALL BE SOWN IN ALL INACTIVE CONSTRUCTION AREAS THAT WILL NOT BE PERMANENTLY SEEDED WITHIN TWO WEEKS OF DISTURBANCE AND PRIOR TO SEPTEMBER 15, OF ANY GIVEN YEAR, IN ORDER TO ACHIEVE VEGETATIVE STABILIZATION PRIOR TO THE END OF THE GROWING SEASON.
   9.4. SOIL TACKIFIERS MAY BE APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND REAPPLIED AS NECESSARY TO MINIMIZE SOIL AND MULCH LOSS UNTIL PERMANENT VEGETATION IS ESTABLISHED.

10. RETAIN SEDIMENT ON-SITE AND CONTROL DEWATERING PRACTICES:
   10.1. TEMPORARY SEDIMENT BASINS (CGP-SECTION 2.1.3.2) OR SEDIMENT TRAPS (ENV-WQ 1506.10) SHALL BE SIZED TO RETAIN, ON SITE, THE VOLUME OF A 2-YEAR 24-HOUR STORM EVENT FOR ANY AREA OF DISTURBANCE OR 3,600 CUBIC FEET OF STORMWATER RUNOFF PER ACRE OF DISTURBANCE, WHICHEVER IS GREATER. TEMPORARY SEDIMENT BASINS USED TO TREAT STORMWATER RUNOFF FROM AREAS GREATER THAN 5-ACRES OF DISTURBANCE SHALL BE SIZED TO ALSO CONTROL STORMWATER RUNOFF FROM A 10-YEAR 24 HOUR STORM EVENT. ON-SITE RETENTION OF THE 10-YEAR 24-HOUR EVENT IS NOT REQUIRED.
   10.2. CONSTRUCT AND STABILIZE DEWATERING INFILTRATION BASINS PRIOR TO ANY EXCAVATION THAT MAY REQUIRE DEWATERING.
   10.3. TEMPORARY SEDIMENT BASINS OR TRAPS SHALL BE PLACED AND STABILIZED AT LOCATIONS WHERE CONCENTRATED FLOW (CHANNELS AND PIPES) DISCHARGE TO THE SURROUNDING ENVIRONMENT FROM AREAS OF UNSTABILIZED EARTH DISTURBING ACTIVITIES.

11. ADDITIONAL EROSION AND SEDIMENT CONTROL GENERAL PRACTICES:
   11.1. USE TEMPORARY MULCHING, PERMANENT MULCHING, TEMPORARY VEGETATIVE COVER, AND PERMANENT VEGETATIVE COVER TO REDUCE THE NEED FOR DUST CONTROL. USE MECHANICAL SWEEPERS ON PAVED SURFACES WHERE NECESSARY TO PREVENT DUST BUILDUP. APPLY WATER, OR OTHER DUST INHIBITING AGENTS OR TACKIFIERS, AS APPROVED BY THE NHDES.
   11.2. ALL STOCKPILES SHALL BE CONTAINED WITH TEMPORARY PERIMETER CONTROLS. INACTIVE SOIL STOCKPILES SHOULD BE PROTECTED WITH SOIL STABILIZATION MEASURES (TEMPORARY EROSION CONTROL SEED MIX AND MULCH, SOIL BINDER) OR COVERED WITH ANCHORED TARPS.
   11.3. EROSION AND SEDIMENT CONTROL MEASURES WILL BE INSPECTED IN ACCORDANCE WITH SECTION 645 OF NHDOT SPECIFICATIONS, WEEKLY AND WITHIN 24 HOURS AFTER ANY STORM EVENT GREATER THAN 0.25 IN. OF RAIN PER 24-HOUR PERIOD. EROSION AND SEDIMENT CONTROL MEASURES WILL ALSO BE INSPECTED IN ACCORDANCE WITH THE GUIDANCE MEMO FROM THE NHDES CONTAINED WITHIN THE CONTRACT PROPOSAL AND THE EPA CONSTRUCTION GENERAL PERMIT.
   11.4. THE CONTRACTOR SHOULD UTILIZE STORM DRAIN INLET PROTECTION TO PREVENT SEDIMENT FROM ENTERING A STORM DRAINAGE SYSTEM PRIOR TO THE PERMANENT STABILIZATION OF THE CONTRIBUTING DISTURBED AREA.
   11.5. PERMANENT STABILIZATION MEASURES WILL BE CONSTRUCTED AND MAINTAINED IN LOCATIONS AS SHOWN ON THE CONSTRUCTION PLANS TO STABILIZE AREAS. VEGETATIVE STABILIZATION SHALL NOT BE CONSIDERED PERMANENTLY STABILIZED UNTIL VEGETATIVE GROWTH COVERS AT LEAST 85% OF THE DISTURBED AREA. THE CONTRACTOR SHALL BE RESPONSIBLE FOR EROSION AND SEDIMENT CONTROL FOR ONE YEAR AFTER PROJECT COMPLETION.
   11.6. CATCH BASINS: CARE SHALL BE TAKEN TO ENSURE THAT SEDIMENTS DO NOT ENTER ANY EXISTING CATCH BASINS DURING CONSTRUCTION. THE CONTRACTOR SHALL PLACE TEMPORARY STONE INLET PROTECTION OVER INLETS IN AREAS OF SOIL DISTURBANCE THAT ARE SUBJECT TO SEDIMENT CONTAMINATION.
   11.7. TEMPORARY AND PERMANENT DITCHES SHALL BE CONSTRUCTED, STABILIZED AND MAINTAINED IN A MANNER THAT WILL MINIMIZE SCOUR. TEMPORARY AND PERMANENT DITCHES SHALL BE DIRECTED TO DRAIN TO SEDIMENT BASINS OR STORM WATER COLLECTION AREAS.
   11.8. WINTER EXCAVATION AND EARTHWORK ACTIVITIES NEED TO BE LIMITED IN EXTENT AND DURATION, TO MINIMIZE POTENTIAL EROSION AND SEDIMENTATION IMPACTS. THE AREA OF EXPOSED SOIL SHALL BE LIMITED TO ONE ACRE, OR THAT WHICH CAN BE STABILIZED AT THE END OF EACH DAY UNLESS A WINTER CONSTRUCTION PLAN, DEVELOPED BY A QUALIFIED ENGINEER OR A CPESC SPECIALIST, IS REVIEWED AND APPROVED BY THE DEPARTMENT.
   11.9. CHANNEL PROTECTION MEASURES SHALL BE SUPPLEMENTED WITH PERIMETER CONTROL MEASURES WHEN THE DITCH LINES OCCUR AT THE BOTTOM OF LONG FILL SLOPES. THE PERIMETER CONTROLS SHALL BE INSTALLED ON THE FILL SLOPE TO MINIMIZE THE POTENTIAL FOR FILL SLOPE SEDIMENT DEPOSITS IN THE DITCH LINE.

BEST MANAGEMENT PRACTICES (BMP) BASED ON AMOUNT OF OPEN CONSTRUCTION AREA

12. STRATEGIES SPECIFIC TO OPEN AREAS LESS THAN 5 ACRES:
   12.1. THE CONTRACTOR SHALL COMPLY WITH RSA 485:A:17 AND ENV-WQ 1500; ALTERATION OF TERRAIN FOR CONSTRUCTION AND USE ALL CONVENTIONAL BMP STRATEGIES.
   12.2. SLOPES STEEPER THAN 3:1 WILL RECEIVE TURF ESTABLISHMENT WITH MATTING.
   12.3. SLOPES 3:1 OR FLATTER WILL RECEIVE TURF ESTABLISHMENT ALONE.
   12.4. AREAS WHERE HAUL ROADS ARE CONSTRUCTED AND STORMWATER CANNOT BE TREATED THE DEPARTMENT WILL CONSIDER INFILTRATION.
   12.5. FOR HAUL ROADS ADJACENT TO SENSITIVE ENVIRONMENTAL AREAS OR STEEPER THAN 5%, THE DEPARTMENT WILL CONSIDER USING EROSION STONE, CRUSHED GRAVEL, OR CRUSHED STONE BASE TO HELP MINIMIZE EROSION ISSUES.
   12.6. ALL AREAS THAT CAN BE STABILIZED SHALL BE STABILIZED PRIOR TO OPENING UP NEW TERRITORY.
   12.7. DETENTION BASINS SHALL BE DESIGNED AND CONSTRUCTED TO ACCOMMODATE A 2 YEAR STORM EVENT.

13. STRATEGIES SPECIFIC TO OPEN AREAS BETWEEN 5 AND 10 ACRES:
   13.1. THE CONTRACTOR SHALL COMPLY WITH RSA 485:A:17 AND ENV-WQ 1500 ALTERATION OF TERRAIN AND SHALL USE CONVENTIONAL BMP STRATEGIES AND ALL TREATMENT OPTIONS USED FOR UNDER 5 ACRES WILL BE UTILIZED.
   13.2. DETENTION BASINS WILL BE CONSTRUCTED TO ACCOMMODATE THE 2-YEAR 24-HOUR STORM EVENT AND CONTROL A 10-YEAR 24-HOUR STORM EVENT.
   13.3. SLOPES STEEPER THAN A 3:1 WILL RECEIVE TURF ESTABLISHMENT WITH MATTING OR OTHER TEMPORARY SOIL STABILIZATION MEASURES DETAILED IN TABLE 1. THE CONTRACTOR MAY ALSO CONSIDER A SOIL BINDER IN ACCORDANCE WITH THE NHDES APPROVALS OR REGULATIONS. OTHER ALTERNATIVE MEASURES, SUCH AS BONDED FIBER MATRIXES (BFMS) OR FLEXIBLE GROWTH MEDIUMS (FGMS) MAY BE UTILIZED, IF MEETING THE NHDES APPROVALS AND REGULATIONS.
   13.4. SLOPES 3:1 OR FLATTER WILL RECEIVE TURF ESTABLISHMENT OR OTHER TEMPORARY SOIL STABILIZATION MEASURES DETAILED IN TABLE 1. THE CONTRACTOR MAY ALSO CONSIDER A SOIL BINDER IN ACCORDANCE WITH THE NHDES APPROVALS OR REGULATIONS.

14. STRATEGIES SPECIFIC TO OPEN AREAS OVER 10 ACRES:
   14.1. THE CONTRACTOR SHALL COMPLY WITH RSA 485:A:17 AND ENV-WQ 1500 ALTERATION OF TERRAIN AND SHALL USE CONVENTIONAL BMP STRATEGIES AND ALL TREATMENT OPTIONS USED FOR UNDER 5 ACRES AND BETWEEN 5 AND 10 ACRES WILL BE UTILIZED.
   14.2. THE DEPARTMENT ANTICIPATES THAT SOIL BINDERS WILL BE NEEDED ON ALL SLOPES STEEPER THAN 3:1, IN ORDER TO MINIMIZE EROSION AND REDUCE THE AMOUNT OF SEDIMENT IN THE STORMWATER TREATMENT BASINS.
   14.3. THE CONTRACTOR WILL BE REQUIRED TO HAVE AN APPROVED DESIGN IN ACCORDANCE WITH ENV-WQ 1506.12 FOR AN ACTIVE FLOCCULANT TREATMENT SYSTEM TO TREAT AND RELEASE WATER CAPTURED IN STORM WATER BASINS. THE CONTRACTOR SHALL ALSO RETAIN THE SERVICES OF AN ENVIRONMENTAL CONSULTANT WHO HAS DEMONSTRATED EXPERIENCE IN THE DESIGN OF FLOCCULANT TREATMENT SYSTEMS. THE CONSULTANT WILL ALSO BE RESPONSIBLE FOR THE IMPLEMENTATION AND MONITORING OF THE SYSTEM.

TABLE 1
GUIDANCE ON SELECTING TEMPORARY SOIL STABILIZATION MEASURES

APPLICATION AREAS	DRY MULCH METHODS				HYDRAULICALLY APPLIED MULCHES[2]				ROLLED EROSION CONTROL BLANKETS[3]			
	HMT	WC	SG	CB	HM	SMM	BFM	FRM	SNSB	DNSB	DNSCB	DNCB
SLOPES[1]												
STEEPER THAN 2:1	NO	NO	YES	NO	NO	NO	NO	YES	NO	NO	NO	YES
2:1 SLOPE	YES'	YES'	YES	YES	NO	NO	YES	YES	NO	YES	YES	YES
3:1 SLOPE	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	NO
4:1 SLOPE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	NO	NO
WINTER STABILIZATION	4T/AC	YES	YES	YES	NO	NO	YES	YES	YES	YES	YES	YES
CHANNELS												
LOW FLOW CHANNELS	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES
HIGH FLOW CHANNELS	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES

ABBREV.	STABILIZATION MEASURE	ABBREV.	STABILIZATION MEASURE	ABBREV.	STABILIZATION MEASURE
HMT	HAY MULCH & TACK	HM	HYDRAULIC MULCH	SNSB	SINGLE NET STRAW BLANKET
WC	WOOD CHIPS	SMM	STABILIZED MULCH MATRIX	DNSB	DOUBLE NET STRAW BLANKET
SG	STUMP GRINDINGS	BFM	BONDED FIBER MATRIX	DNSCB	2 NET STRAW-COCONUT BLANKET
CB	COMPOST BLANKET	FRM	FIBER REINFORCED MEDIUM	DNCB	2 NET COCONUT BLANKET

NOTES:
1. ALL SLOPE STABILIZATION OPTIONS ASSUME A SLOPE LENGTH ≤10 TIMES THE HORIZONTAL DISTANCE COMPONENT OF THE SLOPE, IN FEET.
2. PRODUCTS CONTAINING POLYACRYLAMIDE (PAM) SHALL NOT BE APPLIED DIRECTLY TO OR WITHIN 100 FEET OF ANY SURFACE WATER WITHOUT PRIOR WRITTEN APPROVAL FROM THE NH DEPARTMENT OF ENVIRONMENTAL SERVICES.
3. ALL EROSION CONTROL BLANKETS SHALL BE MADE WITH WILDLIFE FRIENDLY BIODEGRADABLE NETTING.

STATE OF NEW HAMPSHIRE

DEPARTMENT OF TRANSPORTATION ∘ BUREAU OF HIGHWAY DESIGN

WETLAND IMPACT PLANS

REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
12-21-2015	16304erosstrat.dgn	16304	4	16

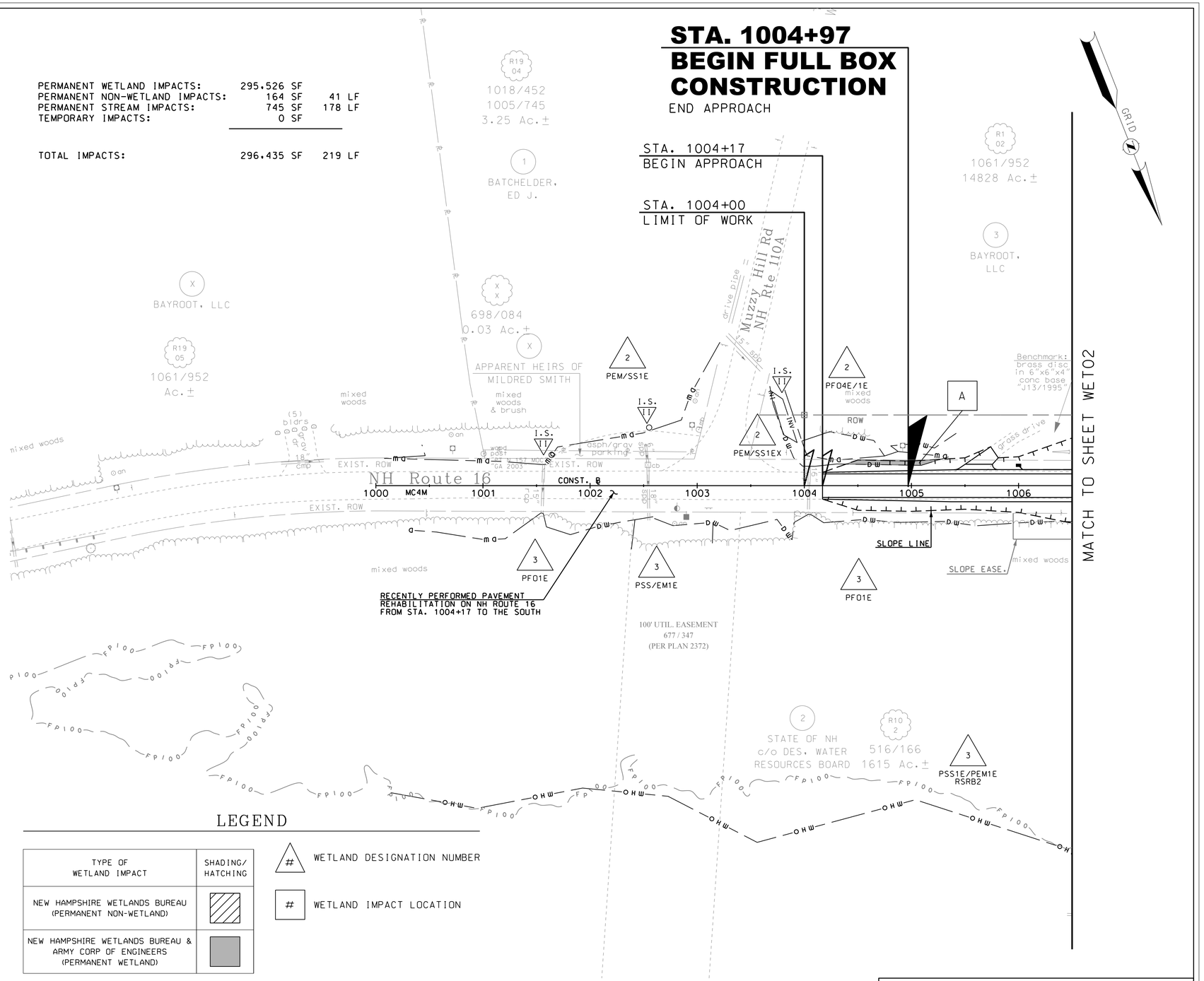
WETLAND IMPACT SUMMARY						
LOCATION	CLASS CODE	WETLAND ID*	AREA IMPACTS PERMANENT N.H.W.B. (NON-WETLAND) SF	N.H.W.B. (NON-WETLAND) LF	N.H.W.B. & A.C.O.E. (WETLAND) SF	N.H.W.B. & A.C.O.E. (WETLAND) LF
A	PEM/SS1EX	2			302	
B	PFO1E	3			468	
C	PEM1EX	2			2042	
D	PFO4E/1E	2			1004	
E	PSS/EM1E	3			890	
F	PEM/SS1F	3			778	
G	PFO4E/1E	2			375	
H	R3UB1 (BANK)	2	164	41		
I	R3UB1 (BED)	2			173	20
J	PEM1EX	2			4220	
K	PFO4E/1E	2			1396	
L	PFO1E	3			77	
M	PFO4E/1E	1			29358	
N	PEM1EX	1			13760	
O	PSS/EM1E	3			238	
P	PFO4E/1E	1			46578	
Q	PFO4E/1E	1			1273	
R	PEM1EX	1			1686	
S	PSS/EM1E	3			58	
T	PFO4E/1E	1			28139	
U	PEM1EX	1			828	
V	PFO4E/1E	1			121354	
W	R4SB4 INTERMITTENT CHANNEL	1			437	145
X	PEM1EX	1			1003	
Y	PSS/EM1E	3			88	
Z	PEM1EX	1			1945	
AA	PSS/EM1E	3			308	
AB	PEM1EX	1			3728	
AC	PSS/EM1E	3			71	
AD	PSS/EM1E	3			200	
AE	PEM1EX	1			6779	
AF	PSS/EM1E	3			595	
AG	PFO4E/1E	1			25985	
AH	R4SB3 INTERMITTENT CHANNEL	1			135	13

* WETLAND ID FOLLOWS STONEY RIDGE ENVIRONMENTAL, JUNE 2014 (SRE #14-017)

WETLAND CLASSIFICATION CODES	
PEM/SS1E	PALUSTRINE, EMERGENT, PERSISTENT, SEASONALLY FLOODED/SATURATED AND PALUSTRINE, SCRUB-SHRUB, BROAD-LEAVED DECIDUOUS, SEASONALLY FLOODED/SATURATED
PFO1E	PALUSTRINE, FORESTED, BROAD-LEAVED DECIDUOUS, SEASONALLY FLOODED/SATURATED
PFO4E/1E	PALUSTRINE, FORESTED, NEEDLE-LEAVED EVERGREEN, SEASONALLY FLOODED/SATURATED AND PALUSTRINE, FORESTED, BROAD-LEAVED DECIDUOUS, SEASONALLY FLOODED/SATURATED
PEM/SS1F	PALUSTRINE, EMERGENT, PERSISTENT, SEMIPERMANENTLY FLOODED AND PALUSTRINE, SCRUB-SHRUB, BROAD-LEAVED DECIDUOUS, SEMIPERMANENTLY FLOODED
PSS/EM1E	PALUSTRINE, SCRUB-SHRUB, BROAD-LEAVED DECIDUOUS, SEASONALLY FLOODED/SATURATED AND PALUSTRINE, EMERGENT, PERSISTENT, SEASONALLY FLOODED/SATURATED
PEM1Ex	PALUSTRINE, EMERGENT, PERSISTENT, SEASONALLY FLOODED/SATURATED, EXCAVATED
PEM/SS1Ex	PALUSTRINE, EMERGENT, PERSISTENT, SEASONALLY FLOODED/SATURATED, EXCAVATED AND PALUSTRINE, SCRUB-SHRUB, BROAD-LEAVED DECIDUOUS, SEASONALLY FLOODED/SATURATED, EXCAVATED
R3RB2	RIVERINE, UPPER PERENNIAL, ROCK BOTTOM, RUBBLE
R3UB1	RIVERINE, UPPER PERENNIAL, UNCONSOLIDATED BOTTOM, COBBLE-GRAVEL
R3UB3	RIVERINE, UPPER PERENNIAL, UNCONSOLIDATED BOTTOM, MUD
R4SB3	RIVERINE, INTERMITTENT, STREAMBED, COBBLE-GRAVEL
R4SB4	RIVERINE, INTERMITTENT, STREAMBED, SAND

PERMANENT WETLAND IMPACTS: 295,526 SF
PERMANENT NON-WETLAND IMPACTS: 164 SF 41 LF
PERMANENT STREAM IMPACTS: 745 SF 178 LF
TEMPORARY IMPACTS: 0 SF

TOTAL IMPACTS: 296,435 SF 219 LF



LEGEND

TYPE OF WETLAND IMPACT	SHADING/ HATCHING
NEW HAMPSHIRE WETLANDS BUREAU (PERMANENT NON-WETLAND)	
NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (PERMANENT WETLAND)	

WETLAND DESIGNATION NUMBER

WETLAND IMPACT LOCATION

50 0 50 100
SCALE IN FEET

REVISIONS AFTER PROPOSAL

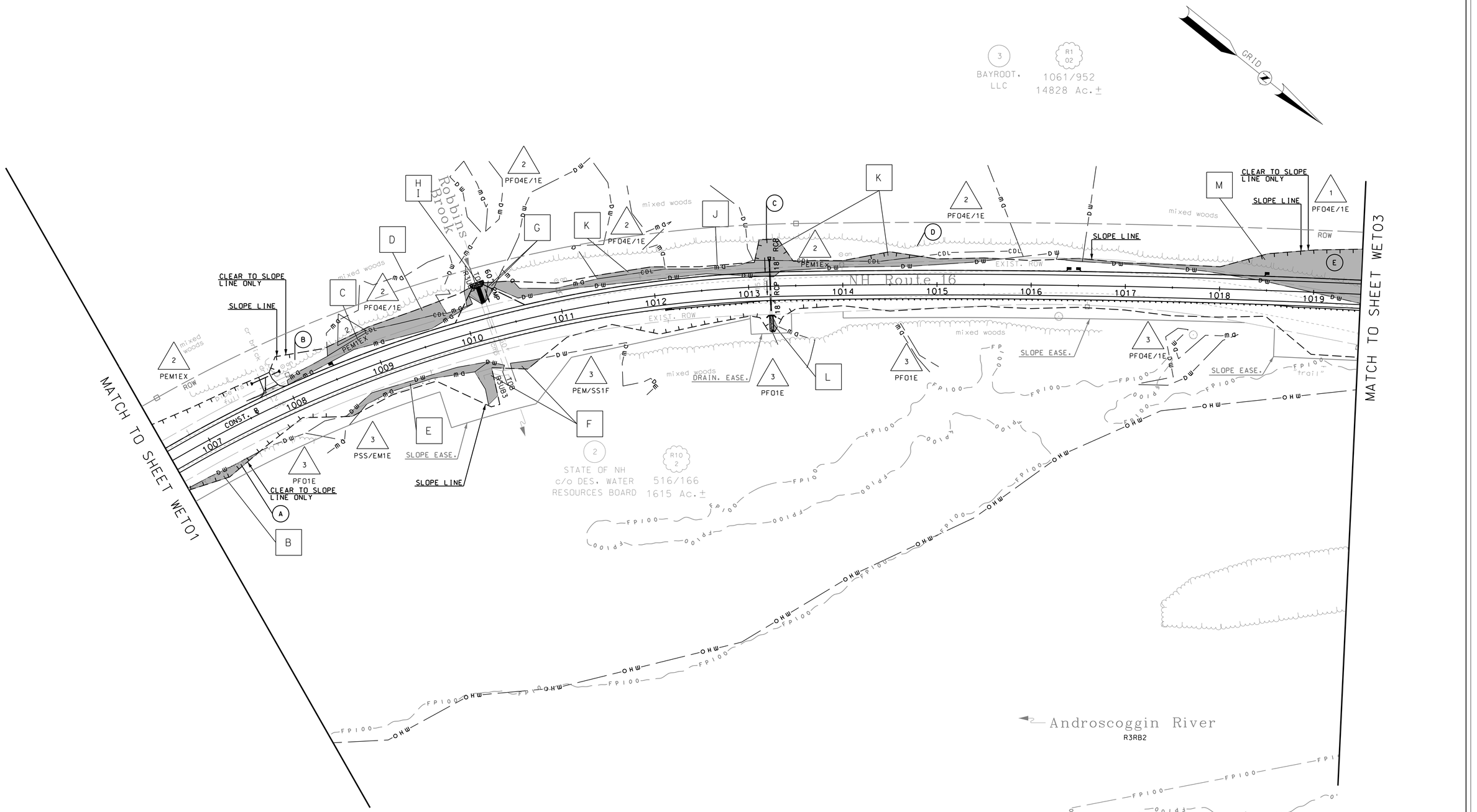
NUMBER	DESCRIPTION	STATION	DATE
		STATION	

SDR PROCESSED VHB TEAM DATE 2/2009
NEW DESIGN lead engineer DATE 1/2017
SHEET CHECKED project manager DATE 1/2017
AS BUILT DETAILS DATE

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION ∘ BUREAU OF HIGHWAY DESIGN

WETLAND IMPACT PLANS

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
4/4/2018	52900.16	Wet01	16304Wet_Plans.dgn	16304	5	16



REVISIONS AFTER PROPOSAL	STATION	STATION	DESCRIPTION	NUMBER	DATE

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NEW DESIGN	lead engineer	DATE 1/2017
SHEET CHECKED	project manager	DATE 1/2017
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STATE OF NEW HAMPSHIRE

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DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
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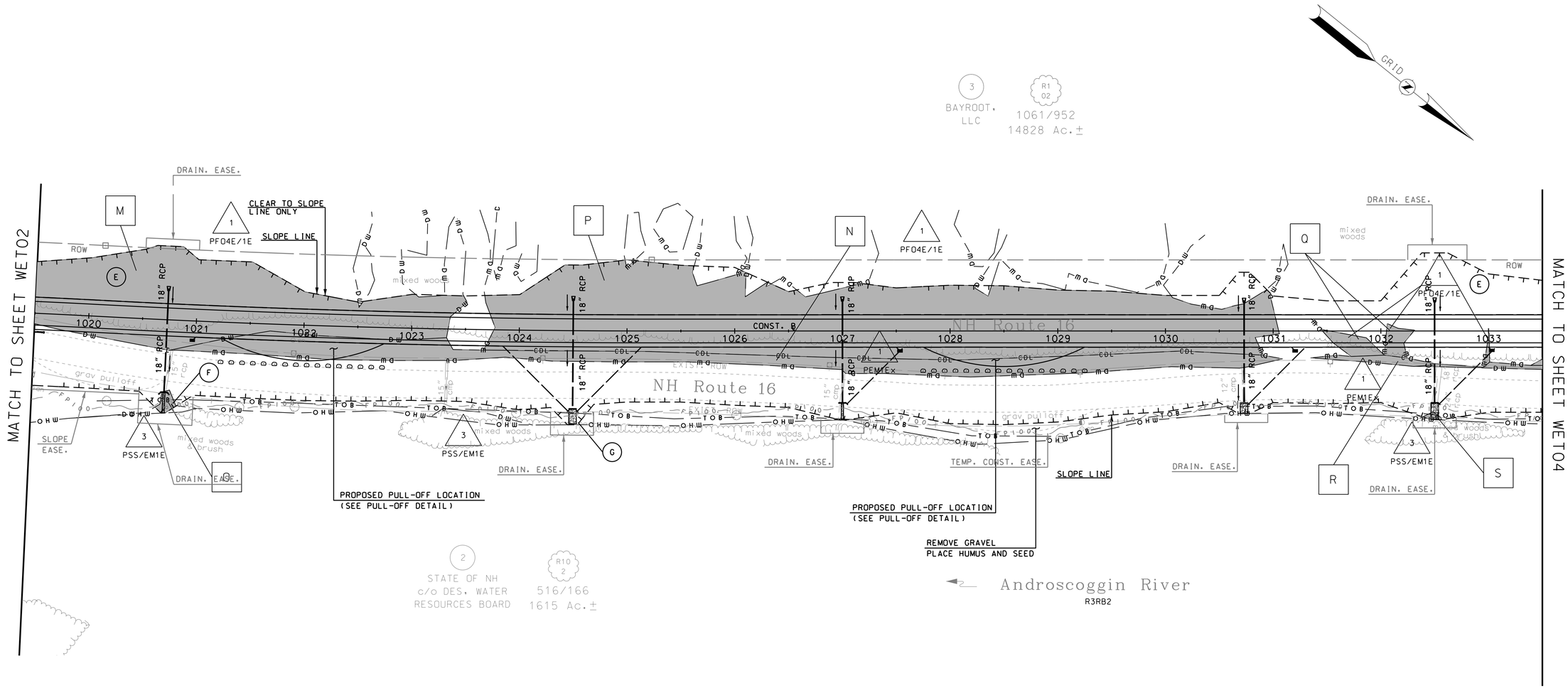

50 0 50 100

SCALE IN FEET

NUMBER	DESCRIPTION	STATION	STATION	DATE

REVISIONS AFTER PROPOSAL

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STATE OF NEW HAMPSHIRE

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WETLAND IMPACT PLANS

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
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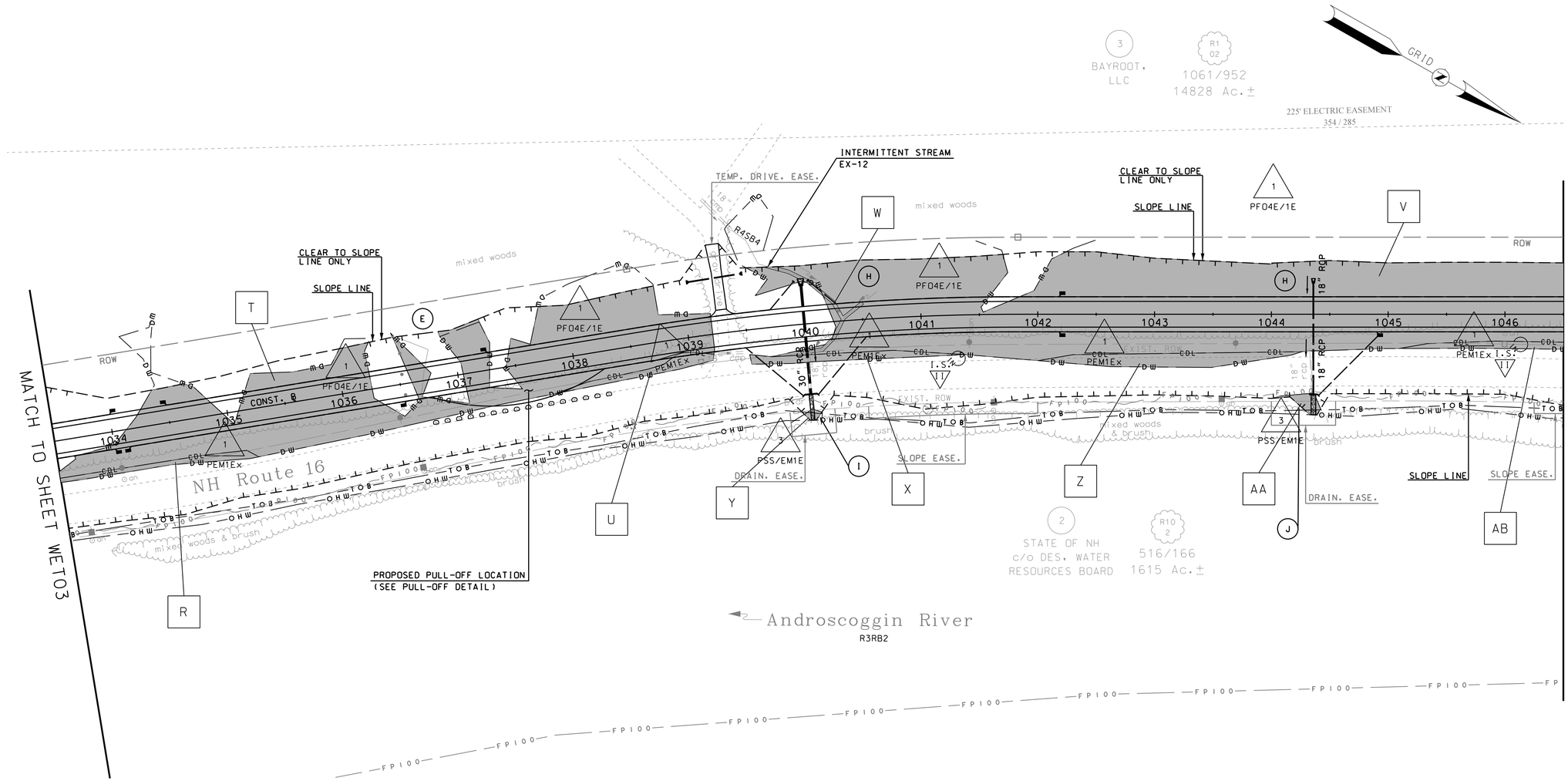

50 0 50 100
SCALE IN FEET

REVISIONS AFTER PROPOSAL

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STATE OF NEW HAMPSHIRE

DEPARTMENT OF TRANSPORTATION ∘ BUREAU OF HIGHWAY DESIGN

WETLAND IMPACT PLANS

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
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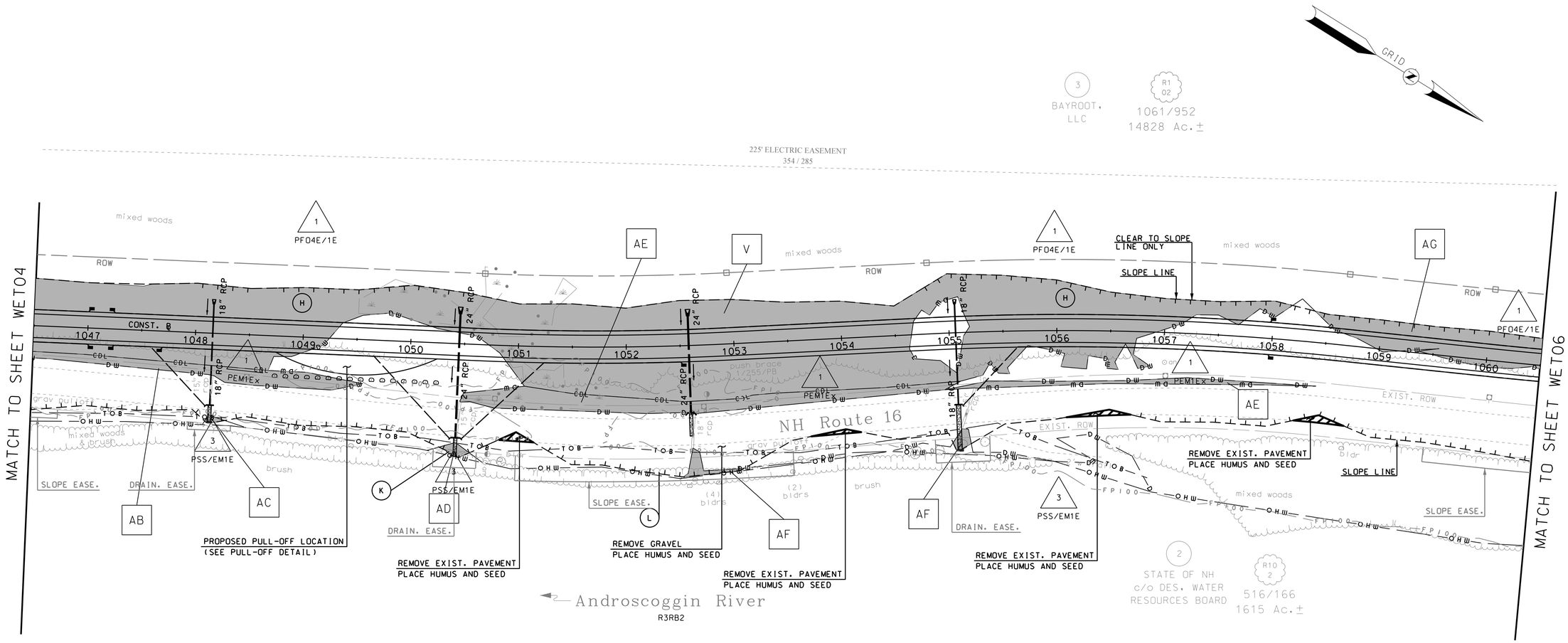

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STATE OF NEW HAMPSHIRE

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WETLAND IMPACT PLANS

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REVISIONS AFTER PROPOSAL

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GRID

MATCH TO SHEET WETO5

225' ELECTRIC EASEMENT
354 / 285

3
BAYROOT, LLC
R1 02
1061/952
14828 Ac.±

2
STATE OF NH
c/o DES. WATER RESOURCES BOARD
R10 2
516/166
1615 Ac.±

Androscoggin River
R3RB2

NH Route 16

Dummer Pond Road
gravel road
ACCESS EASEMENT
1333 / 455
PLAN 3556

mixed woods

ROW

CLEAR TO SLOPE LINE ONLY

SLOPE LINE

SLOPE EASE.

CONST. B

grav pulloff

INTERMITTENT STREAM
EX-20

TEMP. DRIVE. EASE.

PFO4E/1E

PEM1Ex

AG

AH

H

M

N

O

1061 1062 1063 1064 1065 1066 1067 1068 1069 1070 1071 1072

FP100

OHW

SIGHT LINE EASEMENT

CLEAR TO SIGHT EASEMENT LINE

EXIST. ROW

COL

STA. 1069+50
END FULL BOX CONSTRUCTION
BEGIN APPROACH

STA. 1070+50
END APPROACH

STA. 1076+10
LIMIT OF WORK

50 0 50 100
SCALE IN FEET

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION ∘ BUREAU OF HIGHWAY DESIGN

WETLAND IMPACT PLANS

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
4/4/2018	52900.16	Wet06	16304Wet_Plans.dgn	16304	10	16

EROSION CONTROL PLAN LEGEND

PC — PERIMETER CONTROL
SILT FENCE
EROSION CONTROL MIX BERM
EROSION CONTROL MIX SOX
TURBIDITY CURTAIN
SHEET PILE
COFFER DAM

NB/PC — NATURAL BUFFER/PERIMETER CONTROL
SILT FENCE
EROSION CONTROL MIX BERM
EROSION CONTROL MIX SOX
TURBIDITY CURTAIN
SHEET PILE
COFFER DAM

CP — CHANNEL PROTECTION
STONE CHECK DAMS
STRAW WATTLES
CHANNEL MATTING
CLASS D EROSION STONE
CLASS C STONE

CWB — CLEAN WATER BYPASS
PUMP THROUGH PIPE
DRAIN THROUGH PIPE OR CHANNEL

REVISIONS AFTER PROPOSAL

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vhb

STATE OF NEW HAMPSHIRE

DEPARTMENT OF TRANSPORTATION ∘ BUREAU OF HIGHWAY DESIGN

EROSION CONTROL PLANS

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
4/4/2018	52900.16	Ero01	16304ERO_Plans.dgn	16304	11	16

REVISIONS AFTER PROPOSAL

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SDR PROCESSED	VHB TEAM	DATE 2/2009
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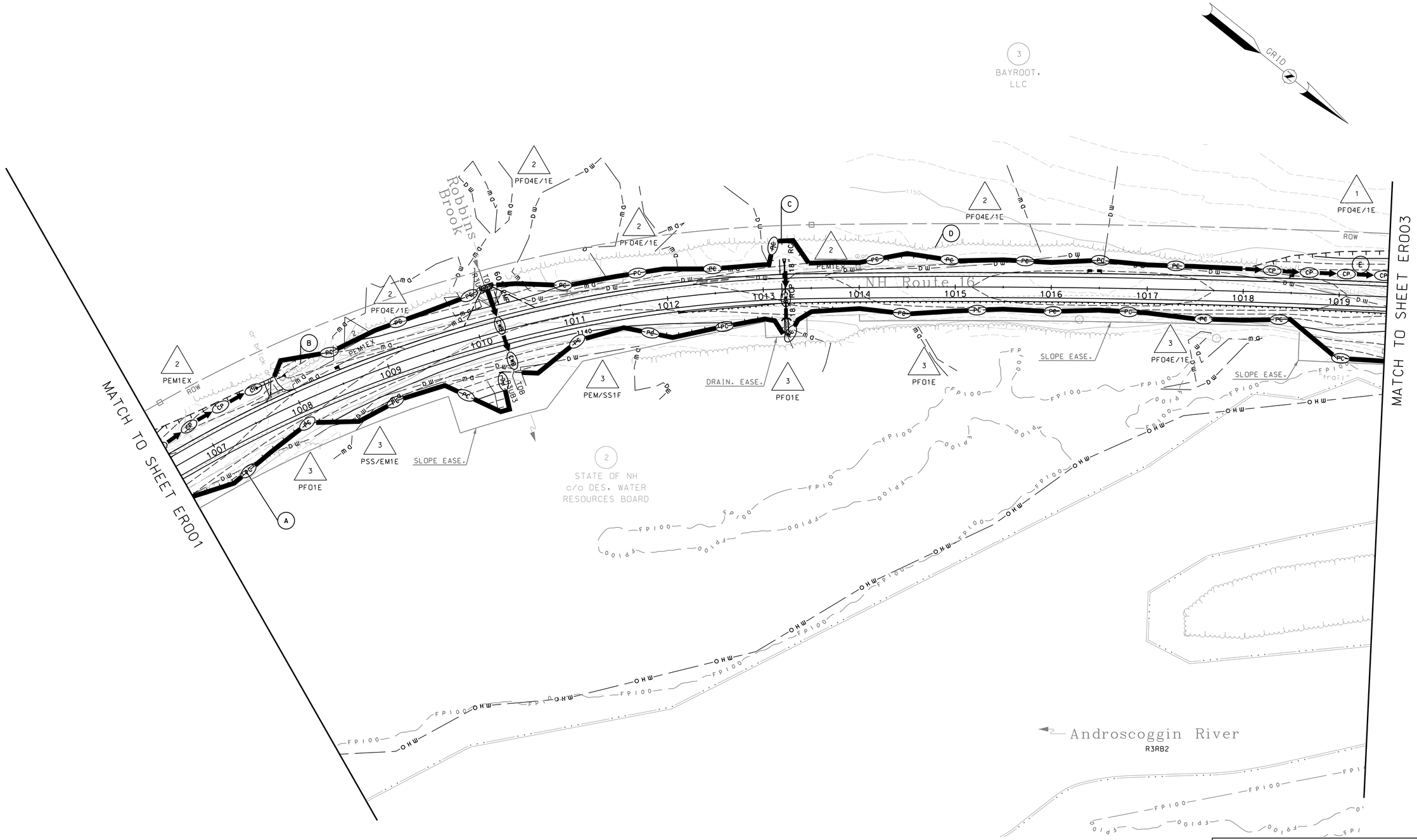
AS BUILT DETAILS		DATE



vhb

STATE OF NEW HAMPSHIRE

DEPARTMENT OF TRANSPORTATION ∘ BUREAU OF HIGHWAY DESIGN

EROSION CONTROL PLANS

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
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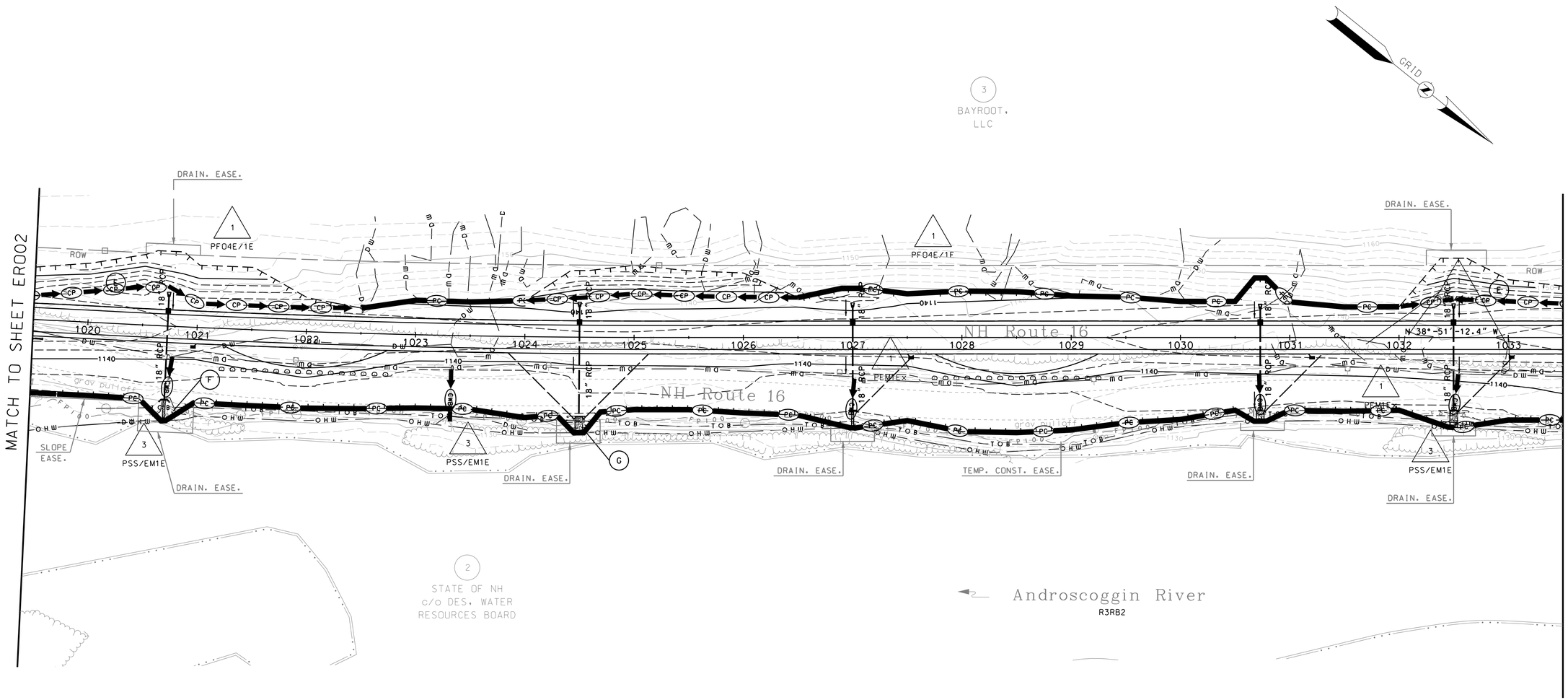

50 0 50 100

SCALE IN FEET

NUMBER	DATE	STATION

REVISIONS AFTER PROPOSAL

DESCRIPTION

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STATE OF NEW HAMPSHIRE

DEPARTMENT OF TRANSPORTATION ◦ BUREAU OF HIGHWAY DESIGN

EROSION CONTROL PLANS

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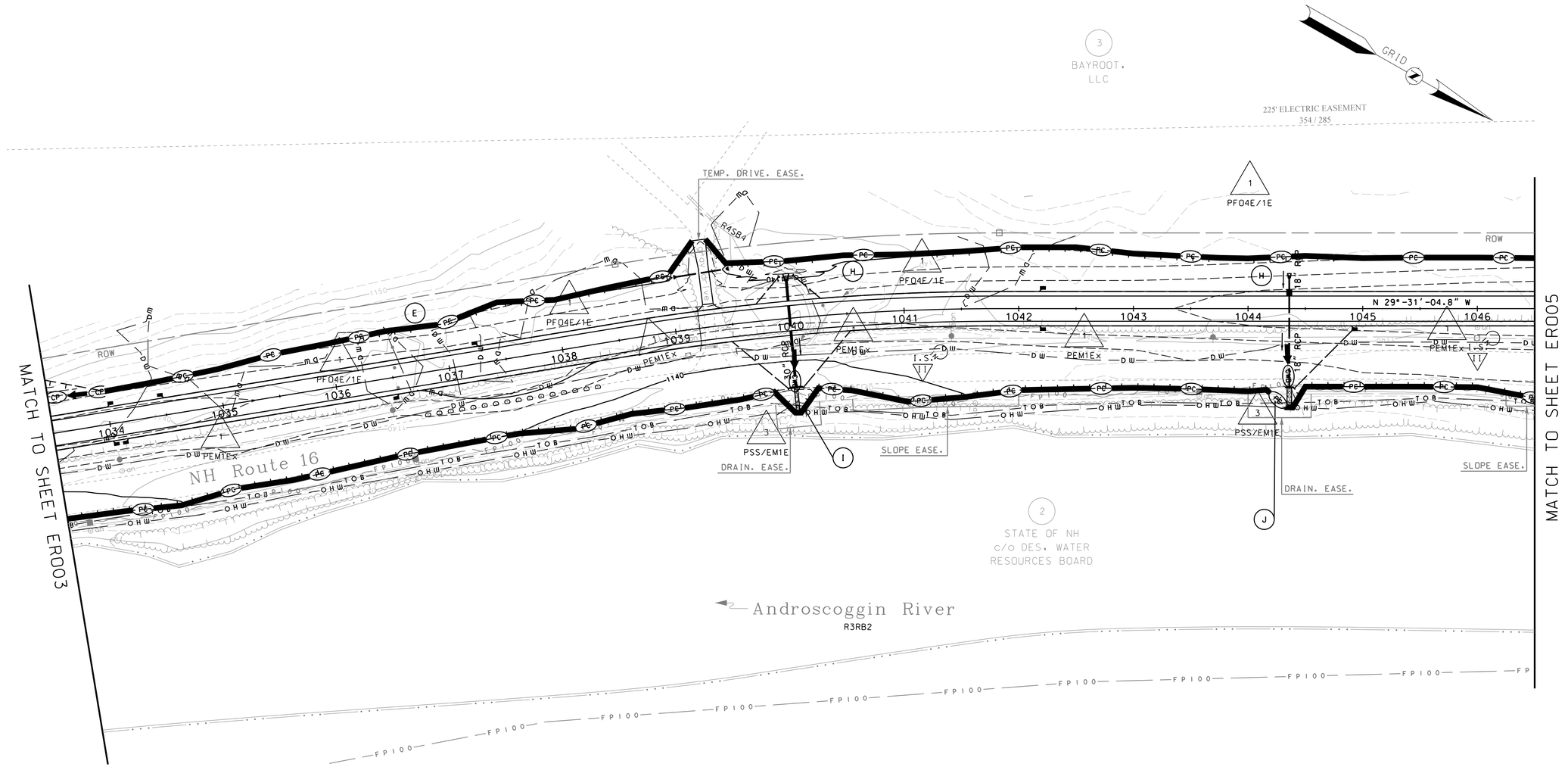

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vhb

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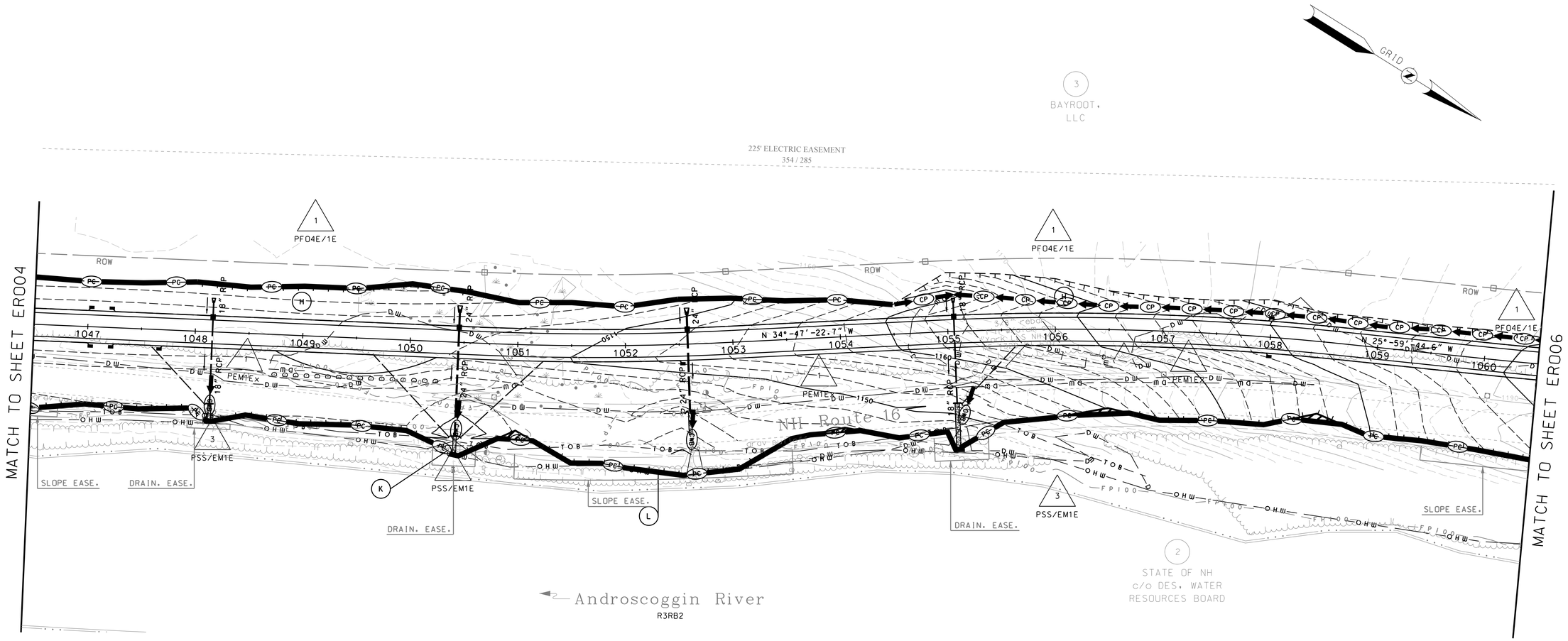

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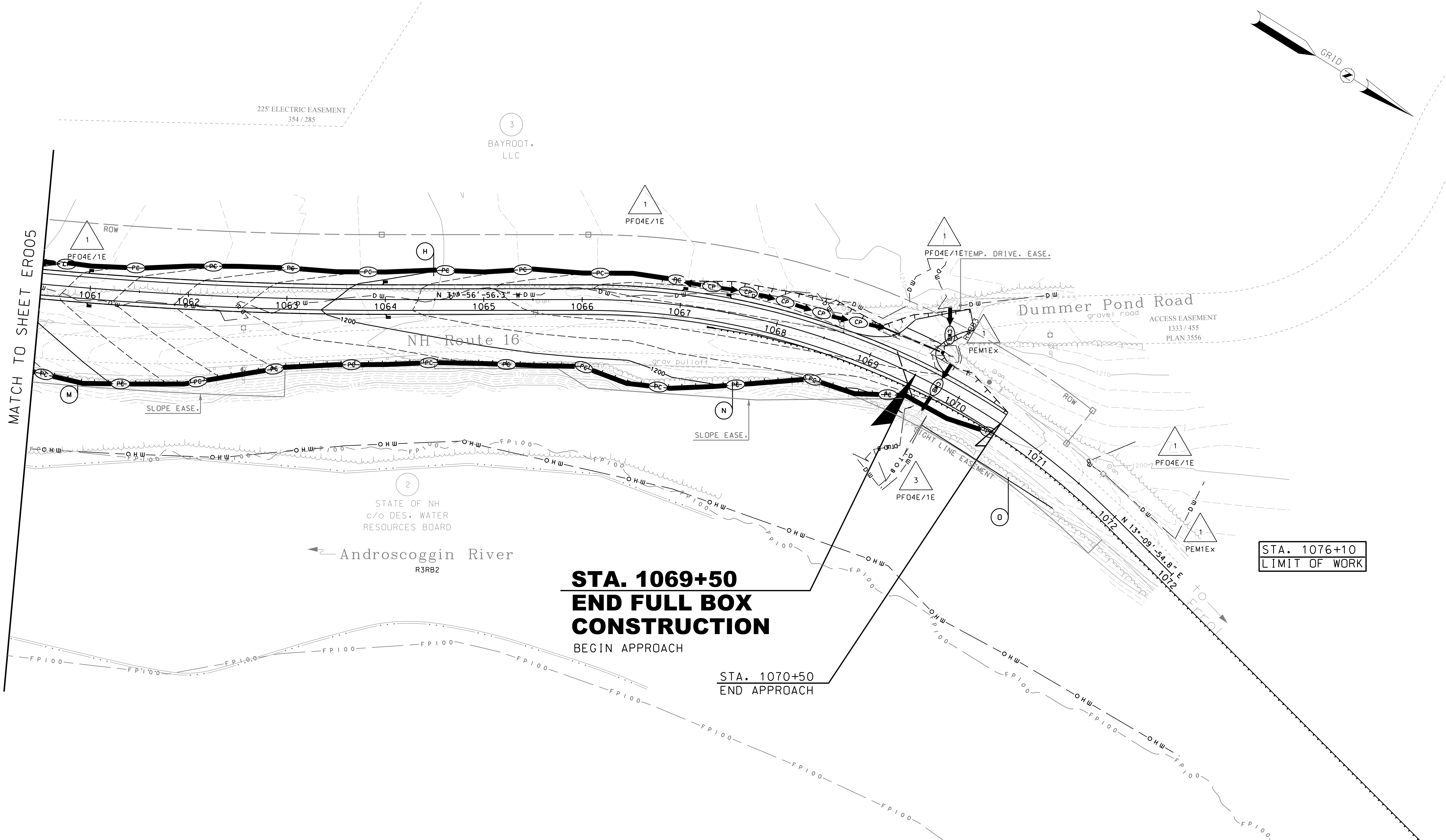

50 0 50 100
SCALE IN FEET

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4/4/2018	52900.16	Ero06	16304ERO_Plans.dgn	16304	16	16